

DOCUMENT RESUME

ED 379 070

PS 022 858

AUTHOR Costa, Arthur L., Ed.; And Others
TITLE If Minds Matter: A Foreword to the Future. Volumes I and II.
REPORT NO ISBN-0-932935-36-2; ISBN-0-932935-40-0
PUB DATE 92
NOTE 676p.; Some pages of student's work may not reproduce well.
AVAILABLE FROM Skylight Publishing, Inc., 200 East Wood Street, Suite 274, Palatine, IL 60067.
PUB TYPE Collected Works - General (020) -- Guides - Non-Classroom Use (055) -- Books (010)
EDRS PRICE MF04 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS Classroom Environment; Cognitive Style; *Cooperative Learning; Curriculum Development; Educational Assessment; *Educational Change; *Educational Objectives; Educational Planning; Elementary Secondary Education; Instructional Innovation; Junior High Schools; Outcomes of Education; Problem Solving; Role of Education; School Role; *Student Evaluation; Teacher Education; Teacher Effectiveness; Teaching Models; *Thinking Skills; *Transfer of Training
IDENTIFIERS Multiple Intelligences; Paradigm Shifts

ABSTRACT

Noting that thinking processes cannot be separated from educational content, this two-volume collection aims to define the profound changes in educational thought during the 20th century, as well as to present examples of how these changes are embodied in excellent schools and other learning communities. Volume one is divided in three sections. The first section provides the background for thought-centered schools and probes their potential, examining both barriers to restructuring and major paradigm shifts already occurring in the schools. Section two calls for substantive school renewal and redesign from the inside out, addressing policy formation at the national, community, and school levels. Section three dictates transformational change for schools, that is, curricular reconceptualization that goes beyond the cognitive and into the metacognitive realm, in which the uses, applications and creative transfer of learning become the most significant outcomes. Volume two also presents three sections. The first delineates the theoretical basis for instructional methodologies that highlight cognitive skills and strategies, outlines cognitive strategies to foster thoughtful classrooms, and presents two scenarios depicting future school models. The second section introduces cooperative learning as a means for developing intellectual skills, indicating that problem-solving and critical-thinking skills can be experienced, practiced, analyzed, and applied in collaborative settings. The final section begins with a reassessment of student assessment methods, elaborates on methods and models for assessing, and provides a strategic plan for tracking students' transfer of learning. Each of the 51 articles includes references. (AA)

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IF MINDS MATTER

A Foreword to the Future



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Edited by
Arthur Costa, James Bellanca,
and Robin Fogarty

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IF MINDS MATTER

A Foreword to the Future

Volume One

EDITED BY

Arthur L. Costa

James Bellanca

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Skylight Publishing, Inc.
Palatine, Illinois

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If Minds Matter: A Foreword to the Future
Volume One
First Printing

Published by Skylight Publishing, Inc.
200 E. Wood Street, Suite 274, Palatine, Illinois 60067
800-348-4474 (In northern Illinois 708-991-6300)
FAX 708-991-6420

Editing: Julia E. Noblitt, Naomi Cohn, Sharon Nowakowski, Marijke Rijsberman
Type Composition: Donna Ramirez
Book Design: Bruce Leckie
Cover Design: David Stockman
Typesetting: Jamie Bellanca, Bruce Leckie, Donna Ramirez

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Printed in the United States of America
ISBN 0-932935-36-2

ACKNOWLEDGMENTS

The orchestration required to publish a two-volume collection—involving four dozen authors who are scattered throughout the continental United States, Hawaii, and into the provinces of Canada—has been a monumental task. Naturally, a project of this scope involves the cooperation and commitment of the players at every level of the production process. However, one person is ultimately in charge; there is only one conductor. In this production of *If Minds Matter: A Foreword to the Future*, that one person has been Julia Noblitt, Senior Editor. Thanks to her expertise, the various elements were gingerly synchronized: assignments were set, monitored, revised, juggled, and adjusted and the production schedule was meticulously met. For this, we are forever indebted to Julie.

Responding to Julie's leadership, we would like to acknowledge the other key players instrumental in crafting these volumes. First, we'd like to thank the authors for their valiant efforts in following our guidelines, meeting our standards, and providing exceptional and enlightening text—all within stringent timelines. As in any concerted effort, the diversity and multitude of the various authored parts have created a synergy evidenced in the finished product.

In addition to the authoring efforts, we would like to acknowledge our production and editing staff for commendable teamwork: Naomi Cohn, Sharon Nowakowski, and Marijke Rijsberman comprised our editorial team. Working at breakneck speed, and yet with the deliberation and care necessary for final copy, they skillfully edited the work of our authors. Also, a note of appreciation is in order for Sandi Schroeder for meeting our indexing needs.

To Bruce Leckie, lead designer on this project, we extend our thanks for the layout design and for the hours of fine tuning required to make it all fit. Working closely with him, we would like to acknowledge Jamie Bellanca for his patience in formatting and revising chapters that were each unique in style and form. Also, in the production and design department, we'd like to thank Donna Ramirez for her seemingly effortless ability to input a never-ending stream of text. And, a special thank you to Dave Stockman for his inspired cover design. We extend our appreciation to both Dave and Kim Overton for handling all the other production in progress. Without their efforts, making our publication deadlines would have been impossible.

Two final notes of appreciation must not be overlooked. At the earliest conception of the

project, we approached Ralph Tyler and asked if he would write an introduction to our work because of his esteemed and historic role in instruction and curriculum development. He graciously accepted our invitation and to him we are forever grateful. Similarly, at the close of the project, we approached Elliot Eisner and asked if he would write a foreword to our work because of his well-known role as a connoisseur in curriculum and program evalua-

tion. He, too, graciously accepted our invitation and to him we are also forever grateful.

In any extraordinary human endeavor, the results speak for themselves. Many hands and hearts have shaped these volumes ... as if minds mattered. To all involved in this labor of love, we thank you.

Art Costa,
James Bellanca &
Robin Fogarty

FOREWORD

At a time when American educators are being riddled by proposals to emphasize content as if it could be separated from the mental processes that give it meaning, *If Minds Matter: A Foreword to the Future* is welcome. From my perspective, the development, even the invention of mind is one of education's major aims. The term *invention* with respect to mind is not a common locution. The ordinary person views mind as something that humans are born with, just as they are born with hands and feet. The idea that mind is a form of cultural achievement, an invented process influenced by the opportunities a child has had to learn is not a common view. Yet, in a very real sense, mind is not something like brain: brain is biological but mind is significantly cultural. The curricula that we provide in schools, the ways in which we teach, the opportunities given to children in the course of their development are opportunities that shape the kinds of minds children will come to own. When we define the curriculum we are defining those opportunities. Decisions that educators and laypeople make about the content of school programs—what is included and what is left out—are decisions about the kinds of content about which children will have an opportunity to think and the kind of cognitive processes they

will have an opportunity to develop. Hence the educator's task in the broadest sense is to generate those conditions that bring mind into being, in part by recognizing the ways in which people can learn to think.

I said earlier that attention to the development of mind has not been salient in the current debate about the aims of education or the content of curriculum. The generally conservative picture of the mission of schools that now prevails is one that emphasizes the acquisition of information. Becoming "culturally literate" is, unfortunately, often related to the acquisition of dictionary knowledge concerning supposedly key events. While there is no question that the processes of thinking require a content, the content can be thought about in ways that are shallow or deep, imaginative or routine, analytic or pedestrian, integrated or fragmented. As Whitehead once said, the merely well-informed man is the greatest bore on earth.

Given the prevailing climate, we all need to remind ourselves that whatever children are able to become will be significantly influenced by the quality of the programs they encounter in school and the character of the teaching that mediates it. Like the systole and diastole of a beating heart, curriculum and teaching

are at the core of education. *If Minds Matter* reminds us of the importance of these processes and the creative role that teachers and educational policy makers can perform in shaping the opportunities children will have to invent their own minds.

The creation of those opportunities will in the final analysis require far more than attention to the curriculum per se, or to the quality of teaching. Neither curriculum nor teaching functions independently of the "biological" environment in which they are housed. The school is, in a sense, a kind of biological environment for curriculum and for teachers. The school provides its own constraints and its own incentives. What teachers are able to emphasize and what the curriculum can become is only in part influenced by our educational aspirations. It is also influenced by the habits that we as teachers harbor, the traditions within which schools function, and the expectations of the community and the students we teach. Put another way, our most noble aspirations to reform education so that mind can be invented in its fullest sense will be tempered by considerations beyond the classroom, indeed beyond the school itself. For example, the communities within which schools reside need to understand that the long-term goal of education is no small victory in an economic arms race with foreign nations, but the invention of the kind of mentality that our culture needs to remain viable, civil, and humane.

This mentality, in its best sense, is not some homogenized uniformity measurable through standardized achievement tests. At its very best, the practice of education cultivates what is distinctive, what is unique about individuals. It is through such uniqueness—what in other contexts I have called productive idiosyncrasy—that the culture itself thrives. A well-developed mind will possess unique features from which the culture is nourished. In a sense, we feed each other precisely from those unique personal aptitudes that we ourselves do not possess. Thus, the aims of education are closely related not only to the invention of mind, but to the invention of individual minds, minds that have a personal signature, minds that see and act upon the world in uniquely individual ways.

The aim of education is not the reduction of heterogeneity in the service of standard attainment, but just the opposite. The goal of schooling is to increase variability among the young while at the same time the magnitude of the mean.

Such an ambition will of course play havoc with simple efforts at assessment. It will create a labor-intensive demand in matters of evaluation, and it will de-standardize what we think schools ought to be about. It is not clear to me whether our own culture, steeped as it is in a meritocratic tradition, will be willing to accept such a personalistic view of the deepest ends of education. We have grown accustomed, I am afraid, to simple answers and to quantitative indices of achievement. We tend to import into education the language of the marketplace and the images of battle.

We need different metaphors, indeed different paradigms. We need images of education that harken to the kinder, gentler America we have heard about. I believe schools have a major contribution to make in realizing such a social ambition. Attention to the potential of mind as a primary educational aim is one of the important steps we can take to move in that direction. Yet as important as it is, it is a limited step. What we do or try to do in classrooms is only a part of the task. As educators, we need to direct our efforts toward the public at large so that they can help us alter the blinkered vision that now seems to drive our schools.

If Minds Matter is an important legitimation of the conviction that mind does indeed matter. Whether it can matter enough to shape school policies will depend not only on what we do in school, but what we can help our constituency come to understand about the deeper purposes of education. *If Minds Matter* has the potential to help us do that. If that potential is realized, it will certainly be an important contribution, not only to the educational literature but even more important, to the practice of education.

Elliot W. Eisner
Stanford University
February, 1992

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This chapter makes the case that we must go beyond restructuring in our efforts to improve education. We must reconceptualize the role education plays in the greater social context. Education can no longer serve the sorting and selecting of our human resources. We must use our education resources to develop the talent of all children and not just a few. Furthermore, we have to recognize the current structural barriers that are preventing learning from becoming the business and purpose of schooling. We must acknowledge the custodial and caretaker functions of schools and move beyond this limited purpose. We have one opportunity to create for the 21st century a truly American education experience, but only if we act now.	
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Achievement Award for excellence in educational journalism by the Educational Press Association of America.)

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If classrooms and schools are to be restructured around the goal of having all students fully use their minds, classroom and school environments will have to be quite different than they are today. Basic propositions driving the current restructuring movement—that all kids can learn, that learning is an active process, that literacy involves thinking and meaning-making, and that knowledge evolves—will bring about profound changes in learning environments. “Basic skills” aren’t enough. Test scores aren’t sufficient. State departments of education, through curriculum frameworks, tests, and technical assistance and reward programs must focus educators on creating optimal learning environments.

8 THE LEARNING COMMUNITY *Arthur L. Costa* 93

There is a quiet revolution taking place. This chapter discusses the team building we hear about in effective schools and classrooms through collaborative learning, participative decision making, and peer coaching and the secondary effect it is having: the intellectual empowerment and fulfillment of the individual. In addition, the author talks about school leaders heading toward a new state of mind—a new conception of their role and that of the educational institution; from seeking power toward empowering others; from controlling people toward facilitating their creativity; from uniformity of practice toward a collective vision of excellence. The chapter concludes with a look at this fundamental shift, this radical reorientation and how the school becomes a learning community for and of the mind.

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- 9 **A RESTRUCTURING JOURNEY** *Barrie Bennett & Carol Rolheiser-Bennett* 103
- The information for this chapter is organized around the authors' metaphorical framework for classroom and school improvement. The framework provides a lens through which the restructuring journey can be examined. Teaching is not mechanistic. In order for change to be initiated, implemented, and sustained in any dimension individually, attention must be paid to the array of variables included in the framework. More importantly, change is in itself an innovation. Failure to attend to the understanding and management of change will most likely result in failure to implement and sustain any innovation.
- 10 **FROM TINKERING TO TRANSFORMATION** *Robert M. McClure* 125
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- 11 **PRINCIPAL POWER: KEY TO SITE-BASED MANAGEMENT**
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- "Principal Power" examines those initiatives that school administrators need to consider in refocusing the school. Empowering staff, providing experiences and support to facilitate shared decision making, and encouraging the active involvement of the greater community are major areas carefully discussed in the chapter. The authors' understanding of the culture of the school, the practical path to implement site-based management efforts, and the analysis of their experiences provide readers with valuable insight into the study of school restructuring.
- 12 **ADULTS FROM THE INSIDE OUT** *Judy-Arin Krupp* 141
- Educators who want to restructure the schools and effect lasting change need to understand the reality view of adults with whom they work. For "we do not see the world as it is, but as we are." This chapter presents two hierarchical views of cognitive development and the practical relevance of each for helping adults grow to the higher stages so they can encompass more variables in their decision making (restructuring from the inside) and for fostering proposed changes.
- 13 **NEW VISIONS FOR STAFF DEVELOPMENT**
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- In order to meet the learning needs of tomorrow's citizens, schools must be redesigned to put learning first. This puts staff development where it needs to be—on the top of the priority list, not on the luxury-item list. In learning communities, teachers learn alongside students; questions are as important as answers; experimentation and risk taking are valued; and making mistakes is a part of growing. The chapter includes vignettes of teachers learning as they design experiences to tackle challenging learning outcomes for their students.
- 14 **SELF-ESTEEM AND THE WILLINGNESS TO CHANGE** *Judy-Arin Krupp* 163
- Positive self-esteem characterizes individuals who willingly risk. Restructuring requires risk. Therefore, it behooves educators to work to enhance the self-esteem of employees if they plan to restructure from the inside out. This chapter defines self-esteem, delineates its sources, discusses the impact of self-image and its resultant self-consistency, and then presents sixteen ways to create an esteeming climate. The author argues that an esteeming climate offers personnel the opportunity to develop a clear self-concept and positive self-esteem so they will embrace change and help others during the restructuring process.

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We must commit to developing the mind as the central role of the school. We must engage a new school culture: one in which school faculties are communities of learners and leaders; where the culture is a catalyst for the development of each faculty member; and where wholeness, efficacy, and self-renewal are valued. Cognitive coaching is proposed as a peer coaching approach that can facilitate these aims. Citing research studies and related literature, the benefits of cognitive coaching are described. Three steps in starting a cognitive coaching program are detailed: (1) developing vision and rationale, (2) selecting a peer coaching model, and (3) adopting six critical program attributes.

16 OLD LESSONS, NEW DESIGNS *James Bellanca* 187

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17 THE SCIENCE AND ART OF TRANSFER *David Perkins & Gavriel Salomon* 201

Transfer of learning is the cornerstone of education. Why teach unless youngsters carry over to other occasions and contexts what they have learned? This chapter defines transfer of learning and looks briefly at contemporary views of transfer—what stands in the way and how can we get past the barriers? Two broad strategies of teaching for transfer, "bridging" and "hugging" are then discussed. The chapter closes with an appeal for the "connected curriculum," where the subject matters stand connected to one another and to life outside the school.

18 TEACHING FOR TRANSFER *Robin Fogarty* 211

Based on the understanding that all learning is for transfer, the chapter begins with an exploration of the *somethings* worth transferring: knowledge, concepts, skills, attitudes, and dispositions. Next the discussion focuses on the *somehows* of transfer in which ten instructional strategies are delineated to both "hug" for near or automatic transfer and to "bridge" for far or inferred transfer: setting expectations, modeling, matching, simulating, and problem-based learning as well as anticipating applications, parallel problem solving, generalizing concepts, unpacking analogies, and cultivating metacognition. Finally, the *somewheres* of transfer are investigated as learning is targeted within a single discipline, across content areas, and into life situations.

19 METACOGNITION: MATTERS OF THE MIND, MATTERS OF THE HEART *Peter Winograd & Robert W. Gaskins* 225

As teachers, one of our most important goals is to help students develop independence of thought. This chapter examines research related to the concept of metacognition and explores insights this research offers educators interested in creating classrooms that nurture independence of thought. The aspect of metacognition most central to the discussion is the understanding that metacognition involves both cognition and affect. Teachers' efforts toward helping students become more metacognitive are effective to the extent that we focus on both of these dimensions of teaching and learning.

20 REFLECTIVE TEACHER, REFLECTIVE LEARNER *Esther Fusco & Gwen Fountain* 239

In order for real learning to occur students must be actively engaged in making connections during the learning process. Metacognition, the ability to understand and control one's own cognitive processes during learning, is an important element in facilitating

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these connections. This chapter focuses on strategies that will assist students in controlling, monitoring, and organizing their learning. The authors show that as teachers model and guide reflective processing, students are able to manipulate and organize information more efficiently and have greater control over their learning.

- 21 "LIKE AN INCREDIBLY HARD ALGEBRA PROBLEM": TEACHING FOR METACOGNITION
John Barell 257
- Many of us go through life in and out of schools without much awareness of how we confront and resolve complex problems. We also have difficulties transferring what we know from one situation to another. This chapter outlines several strategies, drawn from the experiences of practicing educators, that help students gain awareness and control of their thinking, thus becoming more metacognitive. Further, it defines strategies useful in helping all of us transfer knowledge and skill from one kind of experience to another. With metacognitive awareness and the ability to transfer knowledge we become more mindful and capable of dealing productively with life's complexities.
- 22 IF MINDS TRULY MATTER: THE INTEGRATED CURRICULUM *Robin Fogarty*. 267
- Integrated curricula are depicted in this chapter with strategic planning models that make connections for lessons and learners. Based on current brain research that suggests integrated, holistic instruction is most compatible to the parallel processing of the human brain, ten specific integrating schemes are illustrated. Three models focus on making connections within a single curriculum content; five models construct bridges across disciplines; and two final models delineate connection-making within the mind of the learner. Each model is described, illustrated, and evaluated for the reader, with suggestions for creative adaptation and transfer.
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INTRODUCTION

Ralph Tyler

Profound changes have taken place in educational thought since the beginning of the 20th century. In earlier times, social change was relatively slow and the school was generally viewed as the institution to teach children the information and skills of the adults so that the children would be able to take their places and carry on successfully the activities of their parents' generation. However, the increasing tempo of change in American society has resulted in a situation in which each new generation faces problems not faced by their parents. Schools that only prepared children to carry on the activities of their parents and to meet the problems that their parents had encountered became inadequate.

Fortunately, at the beginning of the 20th century a few educators recognized the need for new conceptions of the tasks and procedures of schools that took into account such social change. In their speaking and writing, they led the development of a reformulation of the role and practices of a school that would be appropriate for a constantly changing society. Four major emphases were stressed in this formulation. (1) The role of the school is no longer that of preparing the child to fit

into a static society, but is to educate students to take part in improving society. (2) The curriculum of the school should no longer focus on the memorization of facts and the development of fixed habits, but should emphasize identifying and solving social problems and developing constructive, flexible habits. (3) The activities of the school should no longer be largely limited to reading, listening, and repetitive practice, but should include experiences in which children work cooperatively with others in socially important learning activities carried on beyond the classroom. (4) The evaluation of student learning should no longer be largely restricted to paper-and-pencil tests, but should be based mainly on the child's work in conducting and completing projects requiring the use of the learning that schools are expected to teach.

This reformulation has been developed by educators who are continually seeking to make educational thought and practice appropriate for the needs of society. Perhaps twenty percent of American educators have these views to guide their work. Fifty years hence, it is likely that as many as eighty percent of American public schools will be undertaking such changes.

EDUCATING FOR THE 21ST CENTURY

This book not only defines and describes these profound changes in educational thought but also presents examples of how these changes are em-

bodied in excellent schools and other learning communities. It is an important and exciting presentation.

SECTION ONE

EDUCATING FOR THE 21ST CENTURY

A friend of ours is a cobbler. In his small shoe repair shop he artfully plies his craft. Ironically, his shop is located near a Nike Superstore.

The shoemaking industry provides wonderful insight into the speed and impact of change. From the middle ages until the beginning of the 20th century, shoemaking was the cobbler's purview. Working alone with skills handed down from master to apprentice, the cobbler individualized each pair of shoes. He cut the leather, sewed the seams, pounded the nails, and polished the finished pair.

In the late 19th century, factory-made shoes became the norm. An assembly line of machines replaced the cobbler's bench; each worker on the line worked a machine to complete a single task, often touching a shoe only to pass it to the next station.

By the 1980s, the shoe assembly line was giving way to a new phenomenon: the computerized, robotic assembly process, run by a team of workers who never touch the shoe or the machines. As each order comes for a new variation of a shoe, the team collaborates to change the robot's program and order up a new line of shoes tailored to special big-store buyers.

 hat does the cobbler's plight have to do with educating for the 21st century? Think about the classroom teacher. In the middle ages, the teacher stood before a classroom as the sage who dispensed knowledge. In the mid 19th century, the teacher still stood before the classroom as the sage dispensing knowledge. In most classrooms today, the sage still stands before the class dispensing knowledge. In the meantime, the computer has created an information explosion, shrunk the globe, and changed how most people do their jobs, buy their food, move from site to site, and pay their bills. If the 18th-century cobbler walked into a modern Nike manufacturing

facility, he would have little knowledge of what to do. If the 19th-century teacher walked into a modern classroom, he or she would feel right at home.

For any nation to be competitive in the global economy of the 21st century, it will need a workforce prepared to use 21st-century work tools. There is every indication that the primary work tools of the 21st century will be mind tools, not craft tools. The best workers will need the ability to think creatively and critically, to make decisions and to solve problems. Moreover, mindful workers, no longer isolated at a work bench or on the assembly line, will require complex skills for collaborative conflict resolution and teamwork.

The essays in this section provide the background and probe the potential of thought-centered schools in the 21st century. These schools, built on the belief in the centrality of thinking and problem solving across the curriculum, call for an essential and significant restructuring of what happens in the classroom and outside its walls. The ideas presented in these essays are as thought-provoking as the curriculum and instruction they propose.

The first chapter in this section places the learner at the center of the educational enterprise. To create a vision of what schooling might look like in the next decade, a second chapter explores current world trends and their impact on the future school. Accompanying a discussion about the search for a new educational paradigm, the final chapters lay the groundwork for critical criteria to be considered for schools of the future: a global perspective, a conceptualization of learning as a lifelong endeavor that spans far beyond the traditionally acknowledged twelve years of schooling; and equity issues that protect at-risk populations and foster quality education for all students.

RESTRUCTURING FOR LEARNING

Phillip Harris

WHAT ONCE WAS

Schooling in America has historically modeled itself on society. In pre-industrial America, children trudged through the snow or strolled down dusty lanes to their one-room schoolhouses. They shared learning with their brothers and sisters, working much as a family enterprise might on a farm.

Industrial America introduced the factory model of education, applying advanced production methods to schools. Classrooms became stops on the assembly line of knowledge. Children were segregated by age as well as, shamefully, by race. Older, more educationally "complete" children, moved on to more advanced study. Work was segmented, much as assembly line work in factories segments the production process. Teachers neatly compartmentalized learning.

That is the model which is still with us today. But in the meantime, America has changed. We are entering a post-industrial era, one of information and service, rather than production. The old ways, the tried and true, no longer work, or at least no longer work as well. With the growth of global communication, world economies have become closely

intertwined. Japan looms across the Pacific, a powerful competitor, which has often shown its ways to be more productive, more competitive; offering a better return on investment of both the monetary and human variety. A new Europe promises stiffer competition than in the past.

Japan restructured itself long ago, with America's help. The Soviet Union is struggling to restructure itself, also with western assistance. As America's once great industrial belts are rusting, we, too, are asking ourselves: What now? In few areas is the question asked more loudly than in education.

Almost everyone agrees that education is a key to re-ordering this country. In fact, many see failings in education as crucial to what they describe as the country's stumbling. Our preeminence in many areas is slipping. We still can win wars better than any other country—the Gulf War is proof enough—but can we build better cars? Can we house our homeless, feed our hungry, take care of our sick? Can we keep up in the information race?

The factory system of schooling was good for America for a long time. It trained a work force to the point necessary to perform the job. The best and the smartest (or the richest, sometimes) went

on to become the bosses, the university professors, the country's leaders. The others went as far as they could, or as far as they needed to. They became the workers at the Ford plant, at the foundry, at the mill.

Like the closed and crumbling factories that dot America's industrial midsection—the rust belt—the old educational structure that supported America in its industrial phase is crumbling under a new social system, a new economics, a new world. People—politicians, businessmen, parents, teachers, university professors—call now for a new structure, one that better reflects the needs of the new world.

Restructuring. To rebuild the structure. That's the challenge and the call heard across the country. Schools have formed panels of teachers, parents, students and administrators. School districts are recruiting committees of citizens. School boards seek out experts.

But as our schooling model has historically been drawn from larger society, it is crucial that we not lose track of the larger society today.

RECONCEPTUALIZING WHAT IS

In America today, old factories are not simply being refitted with newer versions of the same old machines. Often, they are closing enterprises. We are not making cars in the same old way; we are using new methods and more machines. Where factories remain, robots are taking the place of workers, or work teams replace assembly-line methods. American work is being reconceived, not simply modernized.

In the same way, schools must not be simply updated, with new equipment replacing the old, then allowed to carry on business as usual. The business itself must change. We must not simply restructure, but reconceptualize education, especially in the following three areas.

- We must recognize that education is a community responsibility and not just the responsibility of educators. Reconceptualizing the education experience will require the time and energies of the entire community.

- We must create a purpose for public education that is broadly and deeply supported at the national, state, and local levels.
- We must redefine what it means to be an educated person.

In order to do this, we will need to rethink, to reconceptualize, the role of the community and the role of the institution within the community. We will have to rethink the curriculum and the notion of accountability. The roles of the school, the teacher, and the student must be redefined. We also need to overcome the barriers to effective teaching and learning.

The Community

American education's greatest strength—or its most serious weakness, according to some assessments—is local control of schools. Some of the thousands of school districts in the country provide superb educational experiences, while others are abysmal.

Local control ensures that a community's schools reflect the aims, values, and needs of that community, in a way that a more distant system might not. In those places where parents and the leadership elites in business and the professions demand and are willing to pay for quality, there is quality. In such communities, schools usually work well.

In other, less fortunate areas, where there is less wealth or less understanding of the urgency of education, schools often fail. They, too, reflect their communities, sometimes shattered by poverty or by the hopelessness of rural isolation.

In America, local control most often means local financing, and that can be either very good for the education of the children in a community, or very bad.

We must confront the inequities inherent in the system of local control of schools, while still retaining the strength and goodness it fosters through the possibility of imprinting community values on its children. That means there must be a leveling of the playing field, but it is critical that it be a leveling up, not down. To shift funding from the best off to the worst off would guarantee no more than

mediocrity, and inevitably would lead to an even more complete abandonment of public education by the rich and powerful, and eventually by the middle class.

The Institution

The effort to restructure our nation's schools will meet with only minimal success until or unless we deal with problems and issues associated with school as an institution.

One of the institution's more important and least trumpeted roles is to be primary caregiver for the children of an increasingly stretched and stressed adult population. This role has grown in importance during the last thirty years, as social change and economic necessity have remolded the American family.

School today is as much the place children go when their parents work as it is the place they go to learn. Increasingly, schools are being asked to provide extended days, so that parents can put in their full eight or nine hours at the plant or office, and know their children are safe. Schools open for breakfast, so kids can start the day with a good, nutritious meal. There is increasing demand for a full range of social services at school, a distant stretch away from the school's traditional task of filling young heads with facts. Parents need school not only to educate their children, but also to care for them during many of their waking hours.

Yet most schools today maintain a schedule that is indifferent to the new needs of families, to the changing demands of society. Only a few keep hours that match an adult work schedule. Days off for the children during the year remain a day-care nightmare for families where both parents must work. The August to June school year is completely out of kilter with the forty-nine- or fifty-week working year of most adults. The current daily and yearly schedules may have been workable in another era, but today they are part of the problem.

The calendars also are a significant political problem for education and educators. School professionals are in the unhappy position of having to convince parents and legislators that learning is a full-time job, even as the evidence revealed in the calendar says it really is only a part-time endeavor.

The Curriculum

Child care is not the only new work schools have undertaken, more or less by default. Legislators have layered on curriculum additions for our nation's schools over the past forty years that have taken up thirty hours of instruction time per semester. Those hours must be absorbed into an already packed curriculum that critics charge permits only cursory attention to subject matter, even before squeezing in new work mandated by lawmakers.

These additions include such topics as: career education, vocational education, computer literacy, African-American history, women's history, health related issues, substance abuse, sex education, economic education, global education, environmental issues, values clarification, planning for retirement, social skills instruction, and mandatory student competency testing.

Such additions are seldom accompanied by mandated cuts of subject matter in other areas of study that would compensate for the resources that teachers must redirect to meet the newest need. The pressure this places on teachers, administrators, students, and parents has reached overwhelming proportions. Ultimately, the system is overloaded, too often resulting in a societal short circuit that turns out the lights in young minds.

Teachers deal with the consequences of such overloading. Some areas of the curriculum are left out entirely or receive just token treatment. By necessity, teaching turns into simply applying a gloss that does not reach below the surface. Getting through the material is too often the priority, not meaningful learning. Quality cannot be maintained in this pressure environment. Teachers do not have time to do a solid job, and students certainly do not have time to develop the depth of understanding necessary for thoughtfulness and reflection.

Talk of a national curriculum, given the current fractured nature of schooling in America, does not offer a clear way out. Such a curriculum would likely become just something more to add onto what's there, rather than replacing it.

Throughout the country, schools are jumping on the restructuring bandwagon. Teachers and administrators, and sometimes students, are making

decisions about how their schools are run, with some promising results. Variations of non-graded schools and classrooms are now in existence, and different forms of integrated subject matter are being taught. The traditional end-of-class bell is ringing through fewer school corridors as schools turn away from segmented learning. In some areas, school is open year-round, with summer vacations shrinking or taken up with new school efforts.

Such changes ensure that schools will be different. But whether the changes are real and substantial, and will make schools better places for education, remains an open question. Schools may look different as a result of restructuring, but it will not be clear for some time whether in fact they are or not, or whether the education they provide is any better. It will be several years before any change in student achievement can be demonstrated. In the meantime, however, we will read in journals and hear reports at national conferences that this or that particular restructuring effort is making a major difference.

That is not to say that restructuring efforts under way now will not have a positive effect on our schools. They almost certainly will. But what is not clear is whether the effect will be permanent or short-lived. Some educators are already wondering if restructuring efforts will be influenced by a Hawthorne Effect, as when medical patients seem to improve when provided with a new course of therapy, only to decline later. Initial improvement may be due to optimism for the new "cure" rather than to a true curative effect. As classroom teachers, administrators, and parents adjust to their new roles and responsibilities, the institutional climate will seem to have improved, and it may have a renewing effect on those who work in and with schools. There may indeed be value in change just for the sake of change. But without real recognition and effort, the effect of these changes will likely stop at the classroom door. The more permanent and needed changes will be harder to come by.

Restructuring efforts will be ineffective if they do not deal with the issues that involve the way teachers and students interact inside the classroom. It is not the length of the school year, or who makes the

decisions on curriculum points, or whether learning is subject- or project-oriented that really counts. Rather, it is in the one-to-one relationship between every student and his teacher. And that too often is overlooked in talk of restructuring learning.

The Teacher

As always, teachers will have the biggest job if we are to get past the superficials of restructuring. They will have to develop a new understanding of what it really means to say "all children can learn." Teachers and administrators alike will have to examine present practices that send the message that "only some children can learn."

That message is loud and clear to children, despite the fact that it is being cloaked in all sorts of disguises and sophisticated educational jargon. And for those who are not included in the "only some" category, the message is deadly.

It is delivered to children from the time they enter school, and comes in many forms. Classroom grouping practices are used in an attempt to reduce the range of individual differences, but by their nature they label "only some" as successful. We shouldn't wonder why such children develop behavior patterns and habits that permit them to avoid too frequent contact with reminders that they're just not very good.

Teachers must examine closely their day-to-day interactions with children to see what changes they can make to send a different set of messages to their students. Unfortunately, the increasing demand for accountability is itself often translated into an urgency to improve test scores, a sometimes false measure of the adequacy of the teaching and learning processes. Paradoxically, the quest for higher standards ends up even more savagely relegating to the scrap heap those students who do not come up to the mark. Such standards do little more than increase the number of students who meet with nothing but failure.

The Student

Students are vital resources. These resources are more valuable than oil, gold, silver, coal, timber—more valuable than any other natural resource. We must think of schools as places to develop the hu-

man resource. The tradition and practice of the past has been one of "sort and select." The world has changed in ways that make this model grossly inadequate. In the past, people who were not selected labored. Today that opportunity for labor is gone. Instead, those who don't make the grade in school too often don't make the grade in life. A resource is transformed into a liability.

As a nation and as a profession we have to come to understand that the development of human resources is time consuming and expensive. The task is as expensive as the development of new technologies, new medical discoveries, a science breakthrough, or space exploration.

As a nation we need all of our people to work together to build the new world order. We need all, not just a select few, to utilize their full potential. The business of schools has to change, to focus on the development of human resources and all that this concept implies. Schools can no longer be the place where the few are chosen. They must be restructured for learning so they become the place where that most valuable of resources, all our children, are nourished.

Schools and classrooms need to stop being places of failure for more than half of those who attend. Failure in school should be viewed as a failure of the system—not of the student. We must stop blaming the victim. Students come to school with the best they have. They enter the system excited and enthused, expecting to learn how to do many different things, and to learn about the world around them. This enthusiasm and excitement too often begins to wane soon after they enter the system. The quick exposure to failure that so many schools provide for so many of their children is a powerful incentive for those children to develop poor habits and patterns of disruptive behavior. Such behaviors are often the only self protections the children can muster.

Accountability

A jammed curriculum has been coupled with a loud call for accountability. State after state has passed legislation requiring more and more testing. One consequence of this increase in testing and the accompanying pressure to have students

do well on the tests is that teachers focus their attention exclusively on what is being tested. And that often is not the same as the curriculum put in place by those same lawmakers who have required the tests. Students end up with perhaps more exposure to a broader range of topics, but know less about any one of them.

Most of the testing done today sorts and selects students and has little to do with directly improving learning. Little use is made of test results to improve learning. Standardized achievement tests were never really designed for interpretation directed at the individual student. Teachers and administrators also do not know how to use the data provided by the tests to improve instruction. Simply using the tests to group students by ability is not a curriculum adjustment that is particularly meaningful or useful.

While standardized testing might have its place in education, we must remember that not everything that is important can be measured in a paper-and-pencil test. We must place more confidence in the teacher's judgment. After all, teachers spend nearly 1,100 hours with students during a typical school year. In contrast, a score on a standardized test represents a very small sample of any particular student's academic experience. It makes better sense to place the greatest burden for judgment on observation over the longest possible period of time. Test item samplings are small, relying on one or two multiple-choice questions to measure understanding of a specific concept. Test-taking and preparation procedures are even less accurate, relying on teachers to provide a multitude of environmental conditions that will create optimum test-taking circumstances.

Tests may be designed to give us a reading on how well little Johnny, Janey, and Jamal are doing. However, we overlook the person who can probably tell us most—the teacher. The classroom teacher has an opportunity to observe the student in a number of situations, using a variety of methods, over a longer period of time and in a broader range of circumstances, and can make judgments a test can never make. Is the child bright-eyed and eager? Is the child too scared to speak up? Is the child bored and underachieving because of a lack

of challenge? Is the child first with her hand raised, eager to join the discussion? Are the child's parents going through a divorce? Is the child afraid of math? Tests may reveal that a child's math scores are not up to grade level, but won't tell why. A good teacher can.

We must trust teachers to make such judgments, and tell them so. The teacher's expert opinion should be valued as much as, if not more than, a number on a standardized test.

To shift the focus from the coldness of numbers back to the insight provided by real people, we first have to show administrators, and many of the teachers themselves, the real limitations of standardized testing. The time involved in taking tests can only be justified if the results are truly informative about a particular child. The most important job of testing should be to help each student learn better and learn more. Our current practice sends a clear message to everyone that standardized tests are given for administrative and political purposes and not educational purposes.

Barriers to Effective Teaching and Learning

The reason we fail so many of our students is rooted in our long-standing tradition of sorting and selecting. Those of us who are "survivors" of the system may believe the reason we were successful was due to our own resourcefulness. We entered a system of schooling that reflected a particular view of teaching, students, and learning. That view is that teachers have knowledge and only need to impart that knowledge to students in order for them to undergo a successful educational experience. Teaching was, and continues to be, based on the giving of information, followed by practice with that information and some independent work, usually called homework. Students were, and continue to be, expected to sit still and pay close attention to "teacher talk." When that talk is over, the work—or practice—begins. With the beginning of practice also begins preparation for assessment—the test. The system is simple: Tell the students what's important, have them remember it, and then ask them to demonstrate on a test that they did a good job of remembering.

Under this system, those students who do poorly are thought to have either not studied or not prepared sufficiently. Or they are categorized as simply not having the ability to do either.

In any case, failing is clearly the student's problem. Placing the blame with the student is important. It gets the system out from under; the finger is shaken at the student, not the teaching. Such a strategy enables the teacher to maintain that he did his job—after all, he provided the instruction. It was the student who failed to take that instruction. Blaming the student allows teachers to ignore possible alternative explanations for students who fail.

The system sets up a sort of "Catch 22," where a failing student does poorly purportedly because the student fails to make the effort necessary, or fails to possess the intelligence or ability to do the job successfully. Failure is expected of a large segment of the class. The system allows such failure to be rationalized on the basis that ability or intelligence is not the same in all children. After all, everyone has known for ages that some people are smarter than others. We have a ninety-year tradition of administering intelligence tests that has clearly revealed that people differ in their intellectual ability. Some of us have it and some of us just don't.

That tradition is among the most serious barriers to real restructuring of the educational experience in America. We have in place a system that says fifty percent of those who enter will not be successful. They will not be successful because the test data proves that half of the students score below the mean on the test and, therefore, cannot be expected to do any better. There are, of course, efforts to raise those scores. But really, does anyone truly believe they can be successful?

The tradition has condemned half of our students to spending twelve years or more in a system that denies them the opportunity to learn. To verify and support the conclusion, students are tested and re-tested; and the data remain the same. Students who do not perform well continue to be students who do not perform well. It is the ultimate self-fulfilling prophecy. It is no surprise that the

drop-out rate is as high as it is. The miracle is that it isn't higher. With our present system we could reasonably expect a drop-out rate that approaches fifty percent of all students. In fact, without compulsory education, would we not likely see a much higher drop-out rate than we do today? If we truly did believe that all children can learn, we would change the way we think about students and their learning potential.

We currently have as many avowed purposes as we have school districts. Moreover, the purpose has to be the real purpose and not a disguise. We can't say we intend to develop democratic values and then not have any democratic experiences. We can't say we want to develop life-long learners and then have policies and practices that make such learning impossible to achieve. We can't say we want an enlightened population, then complain that our high school graduates are not adequately trained for the work place. If we want schools to be the training agency for business and industry, we must publicly and universally embrace that goal. Whatever the goals, we must clearly articulate them, not permitting hidden agendas or unspoken messages to intervene or divide the educational community. To avoid the conflicts that have occurred in the past thirty years between the stakeholders, we have to have congruence of purpose for public education.

During the past ten years Howard Gardner has provided compelling arguments against the current single-trait theory of intelligence that slots so many children into failure. Gardner has identified at least seven areas that merit consideration as intelligence. He further argues that there may be more than seven and he continues to explore this vast, uncharted territory. If Gardner is correct, what would a school look like if it were actually based on the development of multi-dimensional intelligence as opposed to the single-trait theory informing our current educational system? Gardner's work may be of a great significance. Such an approach to our children and their capabilities surely would yield a result that could be vastly different from the current practice that labels so many as failures. We have the option to take such a theoretical frame-

work seriously, and design education to accommodate such multi-dimensional talents. We can begin to discuss how the schooling experience would be different if we believe all children have the ability to learn. Our task as teachers is to discover how to tap into the talents of students and build on them. To change our view and the practices associated with those views means we must take a risk. But the outcome could be that we become a trusted partner in the attempt to develop a wide range of talents, not just a few. The risk will certainly be great, but do we have any other choice?

THE CHALLENGE

Restructuring for learning will require more than money, time and people. It will require changes in the beliefs and attitudes held not only by educators but by the public as well.

School districts that attempt to restructure for learning will face major challenges and questions. They must convince teachers, administrators, parents, students, and the general public that schools are for learning. They must recognize the custodial or caretaker model of education that has evolved, and make changes in it after such recognition. The changes will have to be based on conscious choices made in the public area. They must examine whether decisions are being made according to the best interests of the student, and if they are not, reject those decisions. They must examine the vast number of state and federal regulations that guide education and decide whether they are in the best interest of students. If the answer is no, or if the tasks that have been layered onto schools are overloading the curriculum then they must change or abandon those rules. Schools should exist for learning. A simple but powerful mission. But there are other, secondary missions we have assigned the schools. School is day care. School is socializer and disciplinarian. School is a safe place—or we try to make it so.

It can also be the place to train our work force. It can be that—but only if we want it to be. Such a mission is not automatically one that is contained in the primary mission. And because the educa-

tional needs of the work force evolve as the marketplace adapts to changes, so must the system that trains the workers to operate in that market.

While it is true that all work force training is contained within the larger mission of learning, it is equally true that not all learning can be classified as training of the work force. What constitutes work force training can also change dramatically over the years. Twenty or thirty years ago, welding, carburetor repair, or typing classes were job specific, and young people enrolled in them to prepare for the world of work.

Today, industry wants its workers to have a grasp of math, communication skills, team-building skills, and a knowledge of computers. The factory manager wants adaptability in her workers, not people who can do only one job—the one he or she learned to do in high school.

Another traditional function of the American school touched on earlier, that of sorting and selecting, does not serve as well as it once did. Industry once welcomed workers who were sorted out of school through failure. Now, such failures also fail to master the job in the workplace.

Today, a powerful nucleus of vocal business and industrial leaders believes that schools should prepare the labor force. But that task is not automatically part of the primary mission of learning—there is no natural law that includes one in the other. We first must choose to include such a task. Then—and only if we finally do choose to include it in the bigger job of learning—we must consciously redesign the system to accommodate such training. The effort has a big price tag.

If, as Lee Iacocca believes, Chrysler is the customer of the nation's schools, then the company, as the customer, must understand that there no longer will be a place for "discount schools." The company will also have to understand that they have up to now gotten by on the cheap—never fully paying the bill. For 100 years the education system has been staffed by volunteers. That has changed, and now that the system is made up of people who see education as an occupation and not a calling, they expect fair compensation.

WHAT COULD BE

The major focus of educational research and development for the past fifty years has centered on improving teaching. But too often, the quality of teaching is defined by what it looks like. Attention is focused on whether teachers appear to be following a particular set of steps or sequence in the presentation. If the presentation has all the essential elements, then teaching has occurred. Under such a system, if the student does not learn, then there is something wrong with the student—not with the teaching. After all, the lesson contains all the essential elements, so failure to learn has to be a failure in the student. Such logic leads to the too common refrain of teachers: "I had a tremendous lesson prepared today but the class wasn't interested!" The conclusion then is that the failure rests somewhere outside the teaching.

To make schools exist for learning, we must turn the system on its head. In a school with learning as its fundamental purpose, we would all understand that if learning has not occurred, neither has teaching. Teaching would be evaluated by the degree of learning that has taken place and not by the form of the presentation. In a learning school, the evaluation and assessment of students, teachers, curriculum materials, and organization would have a different focus. The student would be the center of attention, and we would accept that a particular classic teaching method is only one of the many ways a student might learn. The system would be structured to nurture and support the multitude of ways we know that people learn. When learning does not occur, we would look for the problem in the learning environment rather than in the student.

Our basic philosophy must be that all children can and want to learn. We must ensure that children who enter the system with a great deal of interest and enthusiasm, keep it.

We have created a system for adults, not for children. We have a system that says to most of those who enter: "You will not succeed. Only a select few of you will benefit from what education has to offer. The rest of you will not be able to develop your

potential. Since only a few of you will truly benefit, we need to know early in your school career which of you are the chosen few, so we might more accurately direct our resources."

As the research and development efforts of the past have tried to improve the quality of teaching, we have seen little measurable or observable benefit for most of the students. A different tack, one that takes a learning-oriented perspective, would hold that quality teaching is measured by the quality of learning.

As long as we focus on teaching, we won't be able to direct the attention to the learner and the learning. Focusing as we do on teaching does not get at

the heart of the problem of student failure, disinterest, apathy.

We hope that changing or restructuring teaching practice will improve student learning. Teaching practice is important, but it isn't the key to schools that work. We must, as a community, reconceptualize education to put learning first. We must gain consensus for such change and we must redefine and broaden our definition of an educated person. Unless we focus our energies on those issues that truly impact learning in a direct way, we will always be dancing around the edges, and never understand why nothing or very little of what we do changes what happens in the classroom.

REFERENCES

- Barth, R. (1990). *Improving schools from within*. San Francisco, CA: Jossey-Bass.
- Bloom, R. (1981). *All our children learning*. New York: McGraw-Hill.
- Brown, R. (1991). *Schools of thought*. San Francisco, CA: Jossey-Bass.
- Brendtro, L., Brokenleg, M., & VanBokern, S. (1990). *Reclaiming youth at risk: Our hope for the future*. Bloomington, IN: National Education Services.
- Curwin, R., & Mendler, A. (1988). *Discipline with dignity*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Glasser, W. (1990). *The quality school*. New York: Harper & Row.
- Goodlad, J. (1979). *What schools are for*. Bloomington, IN: Phi Delta Kappa.
- Gorman, B., & Johnson, W. (1991). *Successful schooling for everybody*. Bloomington, IN: National Education Services.
- Kohn, A. (1986). *No contest: The case against competition*. Boston: Houghton-Mifflin.
- Oakes, J. (1985). *Keeping track*. New Haven, CT: Yale University Press.
- Schlechty, P. (1990). *Schools for the 21st century*. San Francisco, CA: Jossey-Bass.
- Wlodkowski, R., & Jaynes, J. (1990). *Eager to learn*. San Francisco, CA: Jossey-Bass.

CAPTURE THE VISION: FUTURE WORLD, FUTURE SCHOOL

Robin Fogarty and James Bellanca

The year 2000 is less than a decade away. By then, the body of learnable information will have doubled four times since 1988. Students who will graduate from high school in the 21st century are in the classroom today. Just as Gutenberg's press revolutionized what and how students learned four centuries ago, the microchip will continue to alter teaching and learning in the next century. Schooling in the electronic age may bear little resemblance to the linear print classroom so familiar to us.

What will schooling look like in the year 2000? By updating the works of Toffler, Naisbitt, Ferguson, Cetron, Kearns, Doyle and Osborne with a study of the most current headlines, demographic data and observations of technological developments already commonplace in the home, school and workplace, we can sketch a portrait of the future school with three emerging trends: *interpersonal interaction*, *idea innovation* and *information interpretation*. By analyzing each trend with a future learner's perspective, we can forecast implications for education. The trend of interpersonal interaction suggests the growing need for *learning how to relate*; idea innovation calls for an increased emphasis on *learning how to learn*; and information

interpretation for *learning how to choose*. Together, the three trends give us a vision of what is ahead for today's students in the world of tomorrow.

INTERPERSONAL INTERACTION

The first trend, *interpersonal interaction*, shows society shifting from "me" to "we." Learning to interact and cooperate with culturally and socially diverse peers becomes the first key to school success. Shifts in demographics and politics mandate this change.

People

In the United States, fewer than one in three families can be described as "traditional nuclear families." The number of working women, the mobility of the corporate family, the single-parent household, and blended families created from remarriages continue to increase in number each year.

Also, the rising number of immigrants is changing the composition of neighborhoods. By the year 2000, more than half the school-age children in American cities will be from minority groups. The African-American population, Hispanic citizens and an increasing number of Asian families will

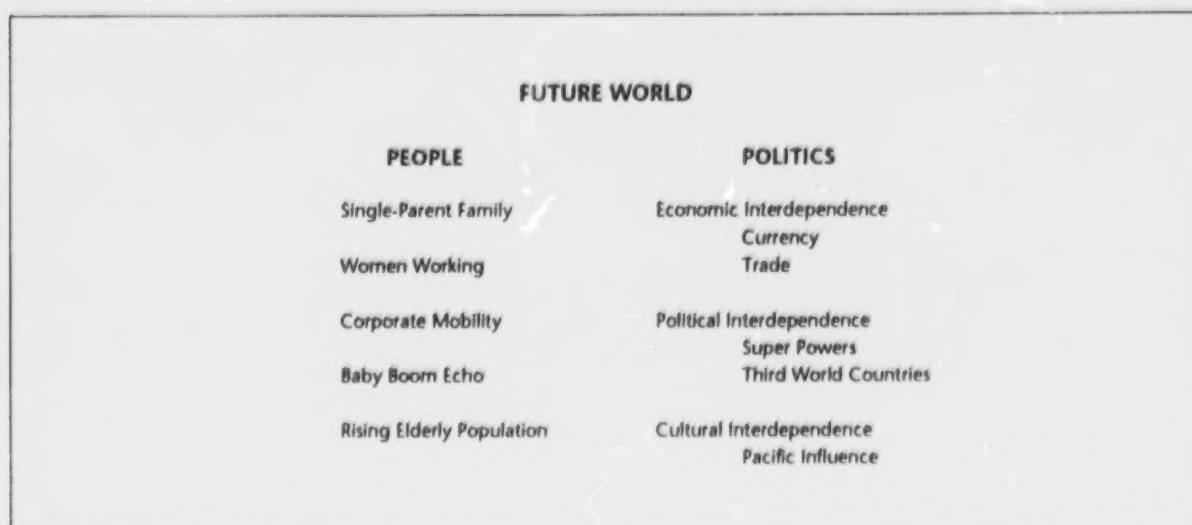


Figure 1 Trend 1: Interpersonal Interactions

spread out from the inner cities to take jobs and residences in suburban villages.

By the year 2000, the elderly population will exceed 32 million people. As the healthcare industry uses technology to stretch the average life-span to 81-plus years, elderly people stay in the job market longer, travel more and provide an increasing number of voluntary services.

Politics

At the national and global levels, we see the politics of interpersonal interaction reaching into every sector of society. Economic interdependence becomes more apparent in world trade and in the international stock indices. The export/import balance has effects around the world as we saw during the energy crisis. Currency prices make the news daily as the mark, yen and pound influence the U.S. dollar. "Buy American," even in the American auto industry which championed the phrase, makes less sense as more major auto parts are imported and as partnerships between the "Big Three" and non-American automakers become commonplace.

With the end of the Cold War, the United States and Russia no longer control the world scene. Third-world countries, totalitarian governments and terrorist groups all have an impact on global politics. The shrinking globe, made smaller by

high-tech transportation and communication innovations, brings conflicts from around the world into our family rooms.

Culturally, economically and politically, the Pacific influence continues to gain entry into all realms of our society. Business, real estate, trade, and education feel the impact of the Pacific wave. As the economic rivalry between the United States and Japan increases, concerns about trade wars and security differences grow.

Implication: Learning To Relate

As we analyze the implications of this first trend, interpersonal interactions, the overriding implication for the Future School is for students to learn how to relate in new and different ways. With the rapid turnover of people in their lives, students in tomorrow's schools will need help in finding ways to accelerate friendship formation, bond to stable forces in their lives and develop the skills of collaboration. In the Future School, we will see a greater emphasis on these collaborative models.

Cooperative Learning teaches interactive social skills and provides peer bonding in the classroom. As students increase their capabilities to relate constructively with peers from more diverse cultural and socio-economic groups, academic achievement, school-liking and self-esteem will improve.

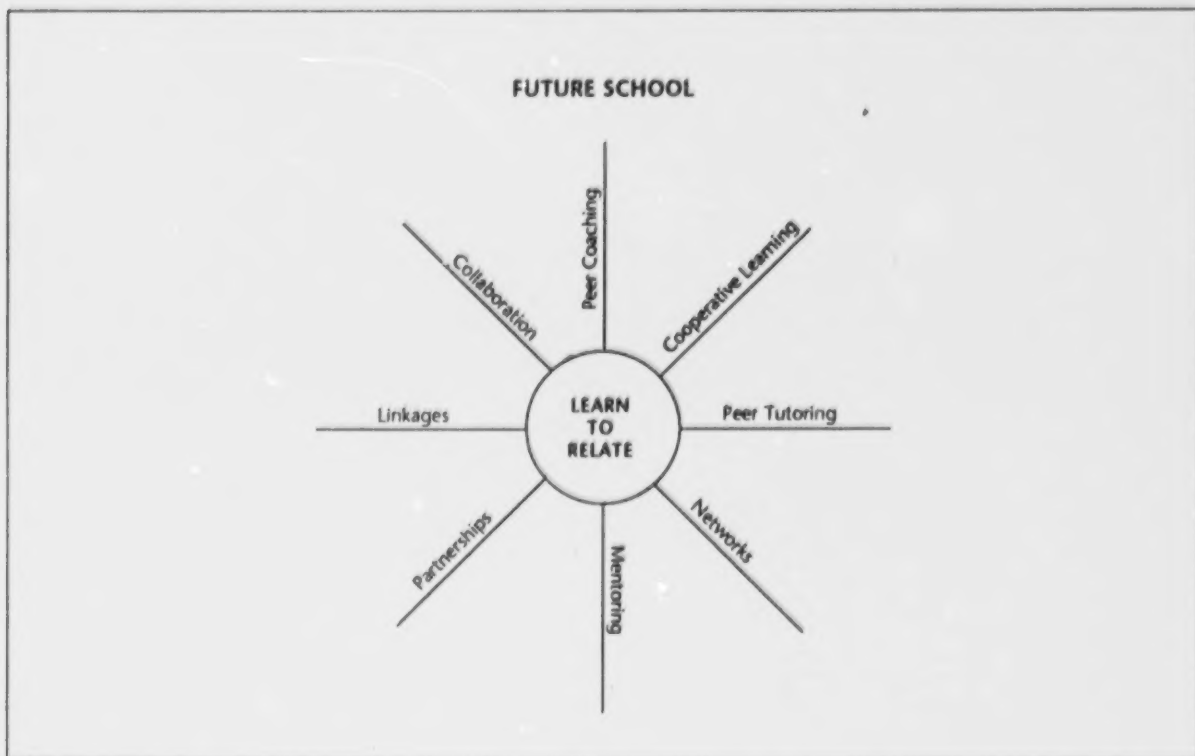


Figure 2 Implication: Learn to Relate

Entire schools will develop a cooperative culture that immerses adults and learners in collaborative learning.

Peer Tutoring helps students learn from each other, both formally and informally, in their own age groups and across age groups and cultures. Not only will tutoring provide a practical tool for classroom teachers to help at-risk and slower-learning students, it will provide a rich opportunity for students to develop bonds with their peers.

Collaborative Coaching Teams and Problem Solving Teams help teachers and administrators work together to improve both instructional content and methodology for a student body with a wide range of cultural backgrounds, learning styles, and readiness to learn.

Networks of professionals from within districts and across district and state lines will meet face to face, communicating with colleagues in other states and countries through computers and satellites. Likewise, students will use electronic links to talk

with peers around the country and across oceans or study cultures first-hand through video.

Mentoring programs bring experts of all ages in contact with each other. Schools will tap the expanding senior citizen pool for help in solving problems created by the demands of diversity. Without needing to leave their homes, students will use dial-help cable TV for homework assistance from elderly volunteers, from teachers, and from peers.

School-business partnerships at local, state and national levels will expand ties between education and industry. Industry will provide an increasing number of fiscal and human resources to help schools better prepare students for the ever-changing work world.

Colleges and universities improve teacher preparation and the overall quality of schools. Research on how to improve schools and specialized continuing education programs for educators will strengthen the bonds between higher education and the K-12 community. Students, parents, and teachers will

communicate through video and computer lines directly with experts on campus.

International exchange programs will introduce more students to the diverse cultures of the world. Students will work in teams to study the range of cultures which they find in their classrooms, travel internationally and explore ways to develop new perspectives for resolving conflict and creating harmony—and continue the dialogue back home.

IDEA INNOVATION

The second trend, *idea innovation*, reveals the shift from the industrial society to the technological society. As information multiplies at rates faster than we can imagine, the need for a primary focus on learning how to learn becomes preeminent.

An analysis of this trend brings us face to face with the high-tech/high-touch phenomenon. Here we quickly discover a unique irony endemic to an age in which technology creates more information than the human mind can digest. To the degree that impersonal technology and the information flood restructure our lives, interpersonal as well as intrapersonal interactions grow in importance. For each high-tech discovery, pressure mounts for a high-touch balance in which communication, positive relationships and cultural understanding are essential.

High-Tech

The high-tech explosion is best recognized in the wonderland of computers. Both hardware and software innovations are developing at such a rapid pace that it becomes an overwhelming task, if not an economic impossibility, to keep abreast of the most current developments.

As fast as new innovations appear in computer hardware, the advances in software are more surprising. Leading the latest in software creations is artificial intelligence. Programmers, most notably in the military and medical fields, are creating expert systems to solve highly specialized problems. In the business world, training design has shifted from print materials to multi-media interactions. Breakthroughs in software already in use emulate the decision-making processes of surgeons and

anesthetists at the operating table, architects at the drawing board, bio-engineers in the laboratory. Complementing the new developments in software are a variety of other innovations in electronics, communications, engineering and production. In electronics, parallel processing systems are increasing the speed of intricate calculations for solving highly complex problems. Microchips are becoming smaller, faster and more powerful. Already our autos, phone systems, and grocery store checkout registers are dependent on the microchip.

In the communications field, lasers, fiber optics, satellites, super conductors and digital screens, all in concert with macro-computers, are changing the speed, accuracy and availability of long-distance and on-the-spot transactions. We can send an instantaneous picture of anything thousands of miles across continents and oceans on a fax machine. Back home, we can witness a laser light reading the coding bars on clothing, hardware, and food purchases. In the hospital operating room, we learn that the laser beam is making the surgical knife obsolete.

Technological breakthroughs in manufacturing and production are just as noteworthy. In manufacturing, high-impact plastics and polymers, microwave processing and molecular engineering are revolutionizing the plant. In the future, we can expect new cars to be almost one hundred percent plastic.

We cannot discuss high-tech manufacturing without including robotics. Not only are these electronic helpmates taking over the dangerous, high-risk tasks, but also the repetitive assembly line jobs that require "6 sigma" precision performance. In bio-medical plants, robots can stamp out millions of specially designed plastic containers, fill each with a precise formula and test content quality without the touch of a single human hand. Most amazing is that such robots in one major health products firm reduced wasted formula by 60%. In that same plant, robots are not replacing human workers as once feared. Instead, robots are increasing the demand to retain workers who can control the machines, analyze data and suggest how to improve the product. As a result, higher quality is assured for the consumer. Visits to new manufacturing facilities in electronics, auto-production and aeronautics corroborate this trend.



Figure 3 Trend 2: Idea Innovation

Genetic engineering is providing some of the most eye-opening innovations. Within the next decade, genetic engineers foresee a form of genetic family screening that will be part of routine physical exams. Soon after a child's birth, doctors will correct defective and disease-bearing genes. Similarly, genetic engineers continue to make breakthroughs in food production. Their experiments are planned to double or triple the nutritional capacity of a single fruit or vegetable. Yes, we can build a better tomato.

High-Touch

This high-tech wave, which throws people into an electronic world of push-button devices, a world in which they spend their days interfacing with a computer screen instead of other human beings, has caused a backlash called high-touch. In the high-touch world, more and more people seek a fulfillment of human needs. This search emerges as a concern with physical fitness, health, nutrition, and general well-being.

High-touch is visible in the growing effort to balance economic and environmental concerns. Protesters step forward to battle over clean air and clean water. Worldwide and local organizations

help save endangered species. Neighborhood groups band together to prevent corporations and local governments from building chemical and nuclear waste producing plants in their backyards.

We see another sign of high-touch in the emerging attention given to the body/mind connection. Corporations sponsor stress clinics and whole health seminars. Drug and alcohol prevention programs have become as prevalent in professional sports leagues as in elementary schools. Eastern religion marries Western philosophy as professional athletes, Olympic stars, and high school heroes discover sports motivation and sports psychology. Physical training is complemented with visualization and meditation and the psyche is tapped to create the mental edge of champions.

High-touch is also evident in the concern for the values of family and life. Presidential candidates argue which party platform most supports the "family." Right-to-life groups battle pro-choice advocates. Legislators struggle with ways to finance daycare, ways to support senior citizens, and ways to ease the problems of the homeless. TV stations, newspapers, professional athletes, foundations, and community agencies band together to battle drug and alcohol abuse.

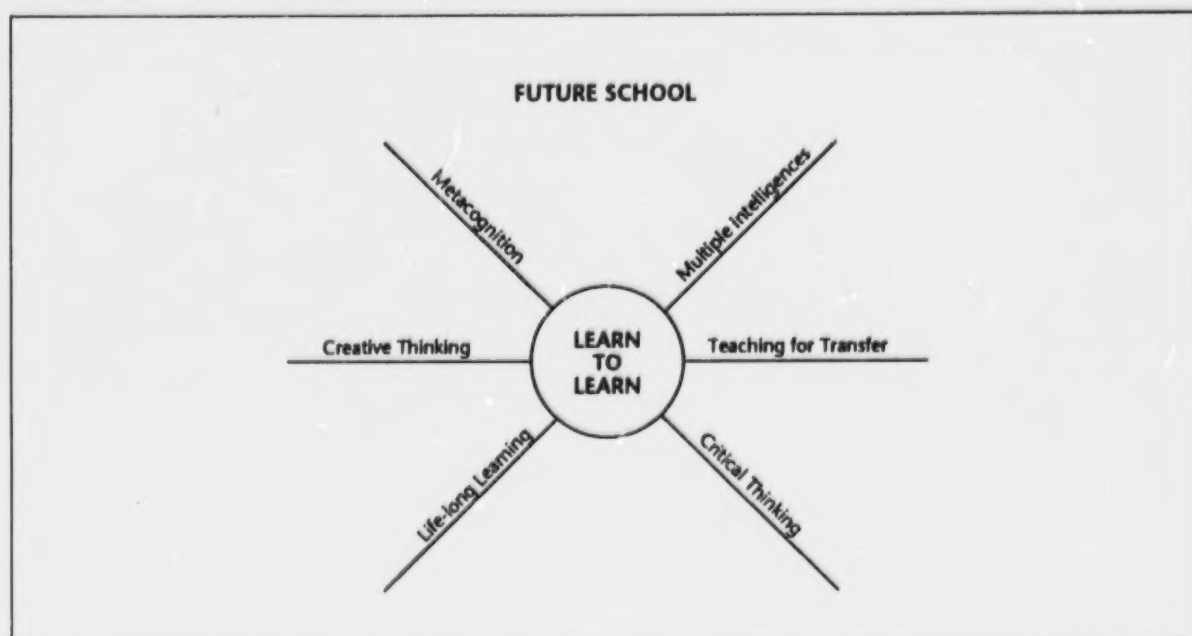


Figure 4 Implication: Learn to Learn

Implication: Learning How To Learn

As we examine the implications of *idea innovation*, the spotlight falls on the need for learning how to learn. By the year 2000, the likelihood of increased job and career changes and a longer life-span argue for a focus on life-long learning. Students will face an increasing demand to learn, unlearn and re-learn. By learning how to learn, students will develop what may best be described as "the key survival skill for the 21st century."

To prepare students adequately for this shifted emphasis, we must view intelligence from its broadest perspective. Gardner's theory of multiple intelligences is one alternative. It suggests that schools might best reorganize so that all students have the fullest opportunity to develop all of their intelligences:

- *Mathematical/Logical* uses skills of analysis and reasoning...
- *Musical*, formerly referred to as musical talent...
- *Verbal* includes reading, writing and speaking...
- *Spatial* uses keen perceptual skills...
- *Body/Kinesthetic* develops the physical ways of knowing...

- *Intrapersonal* embodies the philosophy of "Knowing Thyself"...
- *Interpersonal* governs the range of social skills...
- *Critical Thinking Skills* of analysis and evaluation...
- *Creative Thinking Processes* of generating and producing ideas...
- *Metacognition*—the awareness and control over your own thinking—a necessary focus for life-long learning.

Many will argue that schools already do these things. They will also argue that they teach children to think and problem-solve. There is no doubt that some do, but not to the degree or with the emphasis that the changes in the future world indicate are needed. For instance, most schools do teach for the verbal and the mathematical intelligences. The other intelligences, however, are tangential to the central curriculum. The changes we see in the high-tech/high-touch revolution suggest the need for a more central and purposeful focus on all seven. Furthermore, when we examine what is currently taught for mathematical and verbal improvement and how it is taught, there is serious question about the focus.

The current focus, at least as revealed by the test results we are seeing nationally, has merely tinkered with the need for more skillful critical and creative thinking, problem solving, and metacognition. To be sure, a small number of classrooms are addressing this need in a serious way. However, even many of these see thinking and problem solving as tangential to the "real" curriculum. When we speak of the need for students in the Future School to learn how to learn, we don't mean this is something that would be nice to do, "if there is time." Rather, teaching students how to learn must take first priority, forming the core of the new curriculum. The substantive implication is that the school day will be reorganized around teaching for multiple intelligences. Such a reorganization will have little impact if it does not lead to substantive changes in the preoccupation with covering pages of a printed text in the linear curriculum. The myopic insistence on teaching methods that do more of the same thing must go.

A curriculum, supported by electronic technology, that insists on inquiry, transfer, and creative problem solving will emerge. In this future curriculum, critical thinking skills such as analysis and evaluation, creative thinking skills such as forecasting and dealing with paradox, and a command of how to problem solve will help all students, not only the gifted, develop greater control over their own learning. As students master new "mind tools" (the techniques that enable any learner to gather, analyze, and apply data more skillfully), and those thinking skills that are the heart of the Future School's curriculum, they will become the commanders of information. Whatever the content, whatever the situation or problem, the goal of the future curriculum is to provide the confidence for applying thinking and problem solving. This means that the focus in the classroom will change from the teacher as storehouse of wisdom to the teacher as facilitator of student thinking.

INFORMATION INTERPRETATION

The third trend, *information interpretation*, concerns the shift from an either/or society to a world of multiple choices. Learning how to choose becomes the dominant need as life-long learners improve

their choice-making capabilities. Integrally related to the other trends, it starts with the multitude of options that every individual faces in the information society. Instead of the simple either/or choices that presented themselves in the past, multiple choices have become the norm. By all analysis of the future, the multiple-choice trend will continue to intensify as data feed on data to create more data.

The technological society bombards itself with choices. In terms of products, there was a time when a person could buy a pair of gym shoes, aspirin, or any personal product without the need to research the multitude of specialized models, bottles and fragrances. Today the choice is more complex: shoes for running, shoes for tennis, shoes for aerobics, shoes autographed by your favorite athletic star. Add pain killers with aspirin, weak strength non-aspirin, extra strength aspirin substitutes, generic aspirin and a multitude of brands. Don't forget the choice of the right size, brand, flavor, color, endorsement, and odor of perfume, hair spray, deodorant, shaving cream or nail polish.

Just as the options bombard the consumer with product choices, the same dizzy array blasts the consumer in the service sector. In air transportation: Which airline? Which flight? Which route? Which fare bargain? Which class? If not air, is bus, car or train a better choice? The maze becomes so mind-boggling that many resort to the easiest and safest choice: "just pick something for me."

The confusion that faces the consumer with product and service choices is mild compared to what awaits her in the information world. The barrage of available media is almost unmanageable by the most skillful of decision makers. The selection of packages for word processing or desktop publishing presents an endless software parade. The barrage makes the search for the right package burdensome and confusing.

The ultimate challenge, however, comes not in deciding which item to buy from the smorgasbord of services, products and information. It comes with the emerging moral and ethical decisions created by the shrinking globe and advancing technologies. Genetic engineering, life support systems, organ transplants, mechanical organs,

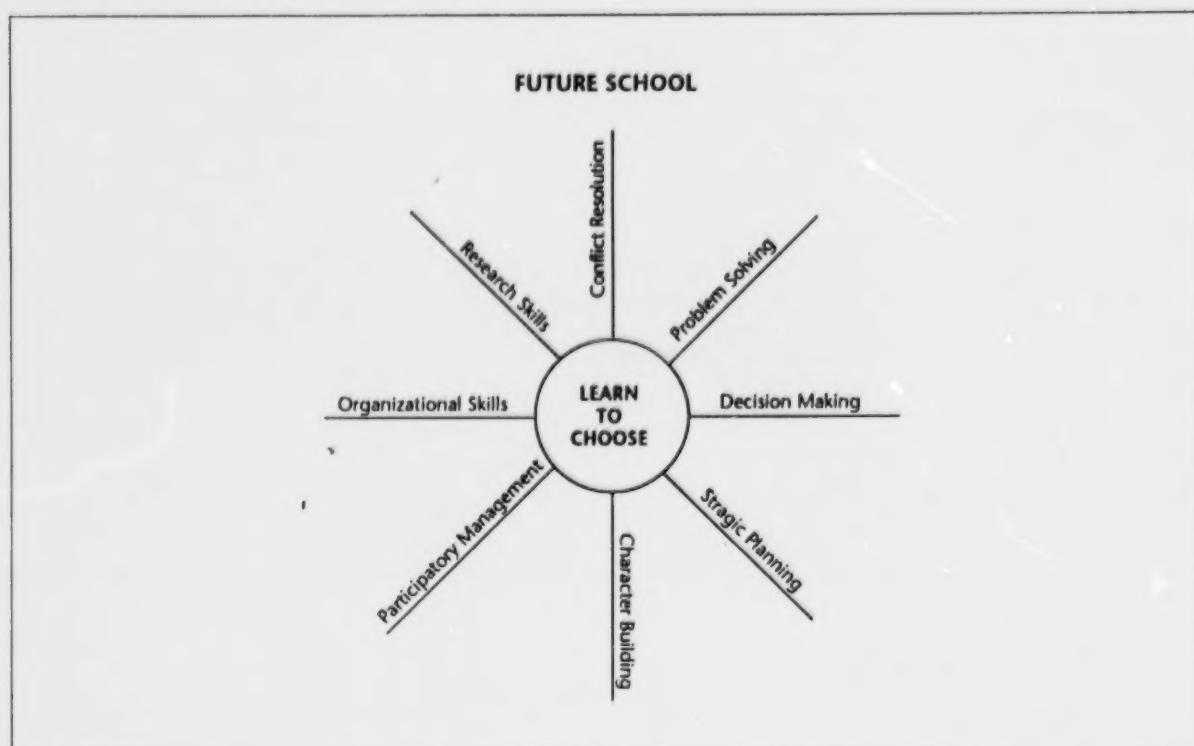


Figure 5 Implication: Learn to Choose

nuclear power, legal and illegal drugs and other issues await legal clarification.

Implication: Learning To Choose

The multiple-choice snowstorm that is blanketing today's students suggests that the Future School must give greater attention to training students in how to make choices. For the Future School's curriculum it is necessary to include some of the following:

Creative Problem Solving in which students learn to tackle real and fictional problems and translate the process to the challenges they face every day: drugs, alcohol, gang pressure, abuse and first careers.

Decision-Making Skills that will help students examine alternatives, take a stand and support the decision with well-evaluated data.

Research Skills with technical and non-technical media for searching out and evaluating needed information.

Conflict Resolution Skills to provide students with the capability to solve problems, negotiate and compromise at the right times.

Character Building Programs to help students understand moral and ethical issues and acquire skills for making reasoned judgments.

Strategic Planning for those who frame the curriculum and provide the instruction. The Future School must provide time for training and development, time to use strategic planning with its emphasis on site-based, participatory management, and time for teamwork and community involvement in systemic patterns of change.

SUMMARY

As we ponder these trends of the Future World and the implications of the Future School, it seems appropriate to note the comment of futurist Daniel Burris who described the flow of innovation in society. Burris notes that innovations are available first to the military, where most of the research and development begins. Next, the innovation flows to the medical world where it is refined and tested. Then, innovations flow to business and industry,

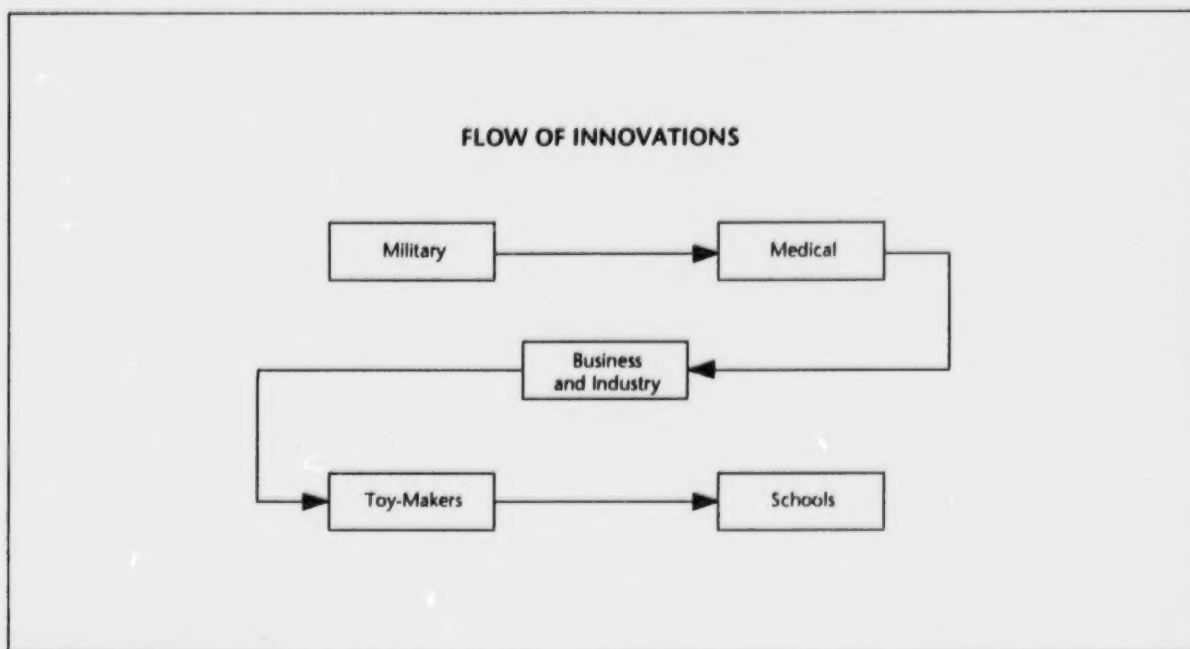


Figure 6 Flow of Innovations

where further creative adaptations take place to meet client specifications. In turn, the toy-makers target the innovation and mass produce simulated versions. Finally, the flow of innovation trickles down into the schools—sometimes many years after the innovation has been totally implemented in these other sectors.

Why is the school the last to know? What can educators do to change this flow? First, they can move to a future-oriented paradigm. It is paramount that they create school missions with a vision of the future. The data are available. The predictions are clear. With the gift of creativity, they can develop plans that are visionary in nature, plans that have change built in. These plans will consider how schools can make the three major trends the central guide to a restructuring of the school. Looking back to see how educators can stay with a curriculum and instructional method designed for an agricultural society will only help perpetuate the failures of the past. Doing more of what was tried in the good old days, even doing that better, has not worked. Educators must position education in the future tense. They must create a future vision as they look into tomorrow with tomorrow's eyes.

WHAT CAN SCHOOLS DO?

To best prepare today's students for tomorrow's world, there are seven important considerations. First, to see tomorrow through tomorrow's eyes, educators can *refocus the curriculum*. Instead of seeing learning as the act of pouring out-of-date information into empty heads, they can focus the future on learning as an act of processing and applying information. The curricular content must put thinking, decision-making, and problem-solving skills at the center of the students' day. Aided by a host of technological tools, students must have the opportunity to extend their learning well beyond the limited curriculum found in schools today. If state offices of education must prescribe time limits to the curriculum, they must give pre-eminence to thinking skills. When those same offices prescribe state tests, the tests must look to see how well students predict, analyze and infer, how skillfully they solve problems, make beneficial decisions, and apply what they have learned.

Second, schools can *shift instructional focus* from methods that are designed to improve rote work to methods that are more appropriate to the mastery

of a high-tech curriculum. In this context, cooperative learning, explicit thinking skill instruction, inquiry and regular use of the computer become integral requirements for every teacher's instructional repertoire.

Third, educators must decide how they will *provide electronic hardware and software* as key learning tools in every classroom. In the primary grades, children can master the basic skills, aided and tutored by the computer. In high school, students can use software to simulate decision making, learn biology, write poetry, wordprocess or make business forecasts and spreadsheets. Instead of spending tens of thousands of dollars on dated, consumable workbooks and expensive print textbooks, strategic planning must allow for the laser technology, hardware-software purchases and repairs, and the equipment repair that will make the computer as common as the pencil in the classroom. The goal is an electronic school in which a variety of high-tech tools enrich teaching and learning and speed the students' access to and use of information.

Fourth, *emphasize staff development*. As Cetron (1988 and 1985) and Kearns and Doyle (1988) have pointed out, business and industrial leaders are unhappy with the \$25 billion spent to teach workers basic skills that should have been taught at school. Not only do we see today's teaching corps as lacking the key skills for working with the at-risk

populations, they see too little attention and far too little money being provided to help teachers gain skills to use software, laser video, cooperative learning and the other instructional methods essential to the classroom of the 21st century. Staff development efforts must increase. A five-percent budget allocation should be standard for the Future School. Ten to fifteen percent may be necessary to provide the amount and quality of training programs that teachers need in order to learn the new knowledge and skills dictated by the high-tech curriculum.

Fifth, students can go outside the school walls for many of the resources they need. Forming *partnerships and networks*, recruiting volunteers from the senior citizen pool and relying on business and industry for expertise in management, training and development, and knowledge of the high-tech work world can only expand the resource pool.

Sixth, schools can investigate a variety of alternatives for *restructuring the learning experience*. With the existing capability of the computer to track student progress, give feedback and guide new directions in any learning task, there is strong reason to expect that the egg-crate structure of the 19th-century schoolhouse with one teacher for each class is as out-of-date as the Model T.

Seventh, we can recognize that the tools now exist for *restructuring the Future School*, so that the future becomes the present tense. There are many ways, but is there a will?

REFERENCES

- Bellanca, J. (1988). *Team stars*. Palatine, IL: Skylight Publishing.
- Burris, D. (1985). *Future view: A look ahead*. Burris Research Associates.
- Cetron, M. (1988). *The great job shakeout*. New York: Simon Schuster.
- Cetron, M. (1985). *Schools of the future*. New York: McGraw Hill.
- Costa, A. (1984, November). Mediating the metacognitive. *Educational Leadership*, 42(3), 57-62.
- Ferguson, M. (1980). *The aquarian conspiracy*. New York: J. P. Tarcher.
- Gardner, H. (1983). *Frames of mind*. New York: Basic Books.
- Johnson, R., & Johnson, D. (1986). *Circles of learning*. Alexandria, VA: ASCD.
- Kearns, D., & Doyle, D. (1988). *Winning the brain race*. San Francisco: ICS Press.
- Lazear, D. (1991). *Seven ways of knowing*. Palatine, IL: Skylight Publishing.

- Machado, L. A. (1980). *The right to be intelligent*. Oxford: Pergamon Press.
- Naisbit, J. (1982). *Megatrends*. New York: Warner Books.
- Parnes, S. (1975). *Aha! Insight into creative behavior*. Buffalo, NY: D.O.K. Publishers.
- Perkins, D. N. (1986). *Knowledge as design*. Hillsdale, NJ: Lawrence Erlbaum.
- Rico, G. (1983). *Writing the natural way*. Boston: J. P. Tarcher.
- Schlechty, P. C. (1990). *Schools for the 21st century*. San Francisco and Oxford: Jossey-Bass.
- Sternberg, R. (1984, September). How can we teach intelligence? *Educational Leadership*, 42(1), 38-48.
- Toffler, A. (1970). *Future shock*. New York: Bantam Books.

THE SEARCH FOR A NEW EDUCATIONAL PARADIGM

Edward T. Clark, Jr.

In 1962 Thomas Kuhn, in his book *The Structure of Scientific Revolutions*, introduced the concept of "paradigm shift" into the literature and thus, into our ways of thinking about ourselves and the world. Since that time, much has been written concerning the paradigm shift that is occurring in various fields of endeavor.

For Kuhn, a paradigm shift occurs as the result of a shift in the underlying assumptions on which science is based. As he makes clear, at a certain fundamental level, the basic assumptions of a discipline shape the research and results of that research. When the evidence begins to challenge these commonly accepted assumptions, anomalies appear. These anomalies create conflicts—conflicts that can only be resolved by acknowledging a new set of assumptions. As these new assumptions gradually gain acceptance, a dramatic shift occurs both in the nature of scientific inquiry and in our understanding of the role of science in society. To use a Biblical analogy, one cannot put new wine in old wineskins because, in time, the new wine, as it ferments and expands, will burst the old wineskins.

While much has been written about the need for educational reform, not enough attention has been paid to the fact that, in education, as in virtu-

ally every other area of our lives, a major paradigm shift is occurring. Although implicit in each of the many national reports that first officially recognized the current crisis in education, few educators seem to have explicitly identified the problems as resulting from a major paradigm shift.

At a macro level the paradigm shift represents a conflict between two world views. If we think of a world view as a cultural mindset, it seems clear that a technological world view has guided Western thought since the beginning of the Industrial Revolution. Based on the analytical perspective of Newton and Descartes, it reduces things to their smallest component parts in order to understand them. Its strategies are fragmenting, linear, and sequential. Its empirical logic discounts intuition and value-based perceptions and forces us into an "either/or" problem-solving and decision-making mode. This reductionist world view is explicitly taught in our schools and forms the conceptual framework for most social decisions.

A systemic ecological world view is now emerging. Crucial to much of science today, this systems view is a fundamental premise on which the cutting edge of research in every major discipline is based. This new world view is global, holistic, and integra-

tive. Its primary mode of thinking is whole-brain thought, incorporating both inductive and deductive strategies, while integrating both rational and intuitive modes of knowing. Although it acknowledges that for certain purposes the concept of objectivity is useful, this perspective affirms that, at its most fundamental level, all knowledge and experience is subjective and value-laden. As a consequence, in our complex world, the best decisions are more often "both/and" rather than "either/or" choices. This emerging world view acknowledges the importance of science and technology, but holds that these must be understood and applied within the context of a global, ecological perspective.

This changing world view represents a major shift in the context within which education is conducted. Since "context" is "the frame of reference that provides meaning," when the context changes, meaning changes. This contextual shift reflects, at a micro level, a change in the basic assumptions that have shaped the purposes, goals, and methodologies of education since the early part of the century. This shift has resulted from research in the nature of intelligence, thinking, and learning, which has thrown a new light on the vast area of human potential. The research challenges both the way the educational system is structured, and the way teaching and learning are perceived to take place. The purpose of this article is to examine both the conventional wisdom and the emerging assumptions and explore their implications for the four major arenas that are central to education: students, teachers, administrators, and the curriculum.

The approach seeks to provide a "big picture" perspective on issues. Such a synthesis, by its very nature depends on generalizations. Such generalizations are offered here with the full knowledge that many can be challenged with details that seem to contradict the conclusions presented. However, in our concern for pragmatic accuracy and empirical solutions, we seldom examine the big picture, and, as a result, we treat symptoms while the underlying problem goes unattended. It is only when we explore the issues from this macro perspective that we can identify the more fundamental problem.

The hypothesis on which this article is based is that the fundamental problem is one of unexamined assumptions. Once this issue is addressed, we can proceed with our task of designing an educational system appropriate to the requirements of a global information society.

STUDENTS

Stated simply, the paradigm shift vis-a-vis students is the movement from an assumption that each student was born with a given, mathematically quantifiable, intellectual capacity, and to the assumption that each individual student has an innate potential for thinking and learning whose boundaries defy quantification.

There are three areas in which the assumptions shaping our perception of students have changed.

The Nature of Intelligence

We no longer assume that intelligence is a stable quantity, and define it in much broader terms as a result of the work of Howard Gardner on multiple intelligences (Gardner, 1984).

Because I.Q. scores seem to follow the distribution pattern of the bell curve, we have long assumed that student achievement would follow the same pattern. However, in his studies of Mastery Learning, Benjamin Bloom (1984) concludes that, given an appropriate learning environment, virtually all students have the potential for achieving above-average grades. Similar conclusions are implied by Postman and Weingarten (1969), which suggest that student performance is more the result of teacher expectations than the so-called "given" abilities measured by an I.Q. score.

The Nature of Thinking

Implicit in the current wisdom on teaching thinking skills is the assumption that children have to be taught the higher-order thinking skills such as analysis, synthesis, critical thinking, problem solving, creative thinking, and decision making. As a result, we have a multitude of programs, each presenting a combination of discrete strategies by which these skills can be taught. These programs are characterized by several features that reflect

what seem to be outdated assumptions about the nature of thinking.

Many of them tend to emphasize the discrete functions of the right- and left-brain hemispheres. Creativity is considered to be the result of right-hemisphere activity, while problem solving is considered to be a left-hemisphere activity. In recognition of the dominant left-hemisphere orientation of the curriculum, many programs have been developed to train students to use their "right brain."

For the most part, the strategies introduced in these programs are linear and sequential and have been designed as "add-ons" to the curriculum. A typical program is recommended for use in two to five one-hour lessons per week for two to three years. We know now that higher-order thinking is not a linear, sequential process.

Leslie Hart and David Loye have synthesized the tremendous amount of research that has taken place in the areas of thinking and learning. This research strongly suggests that all higher-order thinking is whole-brain thinking, and is an innate rather than a learned capacity.

For example, David Loye (1983) describes how the brain functions in a problem-solving mode. There are essentially three, virtually simultaneous steps. In the first step, the right hemisphere identifies the "gestalt," the big picture, the context. Given the holistic perspective, the left hemisphere begins to sort out and arrange details and identify probable solutions. Based on the input from the two hemispheres, and with additional input from the senses and the intuition, the forebrain, acting in its executive role, evaluates the information and makes a decision.

The evidence is strong that all higher-order thinking involves these three steps: context, content, and conclusion. The difference between the diversity of thinking skills that are taught in current programs may well lie in the context that triggers higher-order thought. Whether the context calls for a problem to be solved, an analytical critique or a new way to evaluate learning, the fundamental brain process is the same. Though it takes many forms in response to specific situations, it seems appropriate to conclude that all higher-order

thinking is, at its most fundamental level, "creative problem solving." It is this capacity, which I call "contextual thinking," that distinguishes humans from other animal species. If these conclusions are sound extrapolations from the latest research, then our children do not have to be taught how to think. Strategies are needed for triggering this innate higher cognitive function. An example will highlight the difference between the two approaches, each based on a different fundamental assumption about the nature of thinking.

A strategy for teaching elementary students how to summarize a story (synthesis) proposes the following steps:

1. Delete trivial material
2. Delete repetitious material
3. Substitute a general term for a list of specific terms
4. Combine a list of actions into a broader, single action
5. Select a topic sentence
6. Create a topic sentence

Hart (1983) uses an analogy to demonstrate the futility of sequential learning strategies such as this. He hypothesizes teaching someone to ride a bicycle by sequentially teaching them how to steer, to pedal, to balance, to lean into a turn, and to stop. He concludes that it is the coordination of these that is the essential learning.

Based as it is on outdated assumptions about thinking and learning, such linear strategies are counterproductive. Like many other models for teaching thinking skills, they tend to ignore context and focus almost exclusively on a linear mode of thinking when, in reality, this mode represents only one part of whole-brain thinking.

I have found, in my work with elementary students, that a simple question like, "How would you tell the story in one sentence?" is sufficient to trigger the skill we refer to as synthesis. Indeed, my experience, and that of teachers in "contextual thinking" workshops, has been that any of the higher-order thinking skills can be triggered by appropriate questions related to the subject matter under consideration.

This research does not deny the usefulness and necessity of what David Perkins (1984) calls "tactics" and "thinking frames." Such a "bag of tricks" helps students organize their thinking in more productive ways. It would seem that many of the "thinking skills" that are currently being taught might better be called "thinking tactics" in order to distinguish them from the more fundamental higher-level thinking. The danger is that by confusing these cognitive processes described above, we mistake one for the other. The result may be that the tactics we teach work in opposition to the natural way of thinking.

Research has now reinforced what every parent has known intuitively: the process we call higher-level thinking is an innate capacity that begins to develop at an early age. I recently watched my two-year-old granddaughter spend ten minutes trying to solve the problem of how to put on her diaper by herself. She laid it on the floor and tried lying on it. Then she tried sitting on it using a variety of postures. Next, she carefully placed it in her rocking chair and tried to sit in it. She experimented with several other strategies, and although she never quite succeeded, the chances are she will try it again. Any parent who has tried to hide the cookie jar from a four-year old knows that young children may be the best problem solvers in our society. Yet, by the time they reach third or fourth grade, teachers have to "teach" them problem solving. What has happened to the innate capacity? Research by Niles Howard (1981) gives us a clue. This study found that "creativity scores invariably drop about ninety percent between ages five and seven." One obvious conclusion, which teachers are quick to reach, is that, upon entering school, the child is programmed for linear, sequential thinking to the exclusion of a more holistic, integrated, innate process.

The Nature of Learning

The first question that most teachers ask when they begin to write a lesson plan is: What do I want the student to learn? The way the teacher answers this question reflects his or her assumptions about the nature of learning, and obviously will have a significant impact on both what is taught and how it is taught.

A generation of teachers has been trained to answer this question in terms of behavioral or instructional objectives. Such objectives represent, by definition, terminal behaviors on the part of the learner that are demonstrable and quantifiable. Behavioral objectives have two specific purposes: to identify the desired outcome, and to measure the degree to which the outcome is achieved. Thus, two functions—goal setting and evaluation—are directly linked in a linear, causal relationship that moves from the end to the beginning rather than the usual direction from beginning to end. According to Mager (1962), "If you are interested in preparing instruction that will help you reach your objectives you must first be sure your objectives are clearly and unequivocally stated. You cannot concern yourself with the problem of selecting the most efficient route to your destination until you know what your destination is."

The assumption on which behavior objectives are based is that learning, like intelligence, can be quantitatively measured. Once we accept this assumption we find ourselves in the same circular trap that we were in with our assumptions about the nature of intelligence. Once you assume that learning can be measured, you end up defining all learning by that which can be measured. Therefore, by using behavioral objectives in the way they were designed to be used, we identify an end result that is measurable, and decide on what we will teach and how we will teach it in order to reach that measurable end result. The obvious choice is to teach that which is measurable. Once in this circular trap, our only option is to teach what we test. Indeed, in essence, that sums up both the purpose and method of behavioral objectives: how to teach what you test. Carl Rogers (1967) describes this circularity as an assumption that "evaluation is education, and education is evaluation."

The result of this way of thinking has been an attempt to reduce all learning to that which can be measured. To accomplish this, we have created an elaborate system of testing based almost entirely on those learnings that can be demonstrated and quantified. In so doing we have reduced concepts like *understand*, *know*, *appreciate*, *enjoy*, and *believe*, into measurable behaviors like *write*, *recite*, *identify*,

list, compare, and contrast. Since the only learning that can be accurately measured without ambiguity is recall, we have, implicitly if not explicitly, reached the conclusion that the measure of recall is a measure of learning. As a consequence, virtually the entire teaching/learning process is centered around the presentation, memorization, and recall of facts.

Once these assumptions are accepted, it logically follows that learning can be made more efficient if enough time is spent on the task at hand. Thus, we have a current emphasis of time on task—all in the attempt to beef up test scores that are based primarily on the amount of material that can be quantified by a test.

NEW ASSUMPTIONS

The new assumptions about the nature of intelligence, thinking, and learning stress that which is potential rather than that which is measurable. Acknowledging both the intuitive and the cognitive aspects of learning, these new assumptions recognize the fullness and richness of learning that can be only expressed through words like *understand, appreciate, enjoy, know, and believe.* Indeed, it is because of the multi-dimensionality of these experiences that behaviorists reject them as unmeasurable. But in rejecting what these words represent, we are in danger of rejecting both the multi-dimensionality and the potentiality of human learning.

It seems evident that human learning is far more complex than the behaviorists recognized. Even with a virtually infinite list of observable and quantifiable behaviors, it is impossible to determine the exact extent to which a student "understands" the causes of the Civil War, "appreciates" a symphony that was studied in a music appreciation class, or "knows" how a cell functions. As such, these learnings cannot be fragmented and reduced to specific behaviors that can be measured. Whenever we attempt this, we ignore the reality that the whole is greater than the sum of its parts, and therefore, cannot be reduced to or comprehended from its parts.

Understandably, if we have to give grades, we must find ways to measure outcomes. As long as we

recognize their limitation, namely that what we are measuring may be only a small part of what has been learned, behavioral objectives have an appropriate place in the evaluation process. However, their use should not extend to identifying what is to be taught and what learning outcomes are desirable. While the two functions of goal setting and evaluation are related, to use behavioral objectives to identify learning outcomes is to let the tail wag the dog. The result is the worst sort of reductionism—reducing the full panoply of human learning to the drabness of what can be memorized and, therefore, measured.

What every teacher and parent wants most of all is for students to understand, appreciate, know, enjoy, and believe. When we acknowledge that this is the true goal of learning, then we are free to expand both the what and how of the teaching/learning process, opening the door to both intuitive and cognitive experiences that enable students to expand their own awareness and begin the process of exploring that untapped potential lying within each of them.

Implicit in the empirical view of learning is the assumption that learning is objective. We now know without equivocation, that all learning is, at its most fundamental level, subjective in nature. Research by Anthony Gregorc (1982) and others makes this clear. While recognizing the individual nature of learning, their work suggests that there are four basic learning styles, or modes of learning. Because all children do not learn the same way, these studies conclude that effective teaching must acknowledge and adapt to these differences. The next step is to acknowledge that because children learn in different ways, there is no standard test by which everyone's learning can be accurately and fairly measured.

The research related to whole-brain thinking reported above also suggests that learning is deductive in nature. Because it is the context that endows anything with meaning, learning always starts with the context as a frame of reference within which the parts can be taught, understood, or deduced.

A study conducted by Even (1981) found that seventy-five percent of all adult learners have right-

brain preferences during the attention and arousal stages of the learning process. It further indicates that in these initial stages of learning the preferred learning mode is holistic, pictorial, and broad-based rather than focusing on separate single concepts. In other words, the first stage of the learning process is similar to the first stage of the problem-solving or decision-making process—a search for context.

If we acknowledge the importance of context in providing meaning, then it seems logical to conclude that all learning begins with context. As Neustadt and May (1986) in their study of political decision making suggest, the first question is not, "What's the problem?" but rather, "What's the story?"

This stands in contrast to the inductive strategy of Cartesian thought, which teaches that the first step in understanding things is to reduce them to their smallest component parts. Based on this Cartesian assumption, facts have been taught as the building blocks of knowledge. As a consequence, almost our entire curriculum has been designed to be taught inductively. The implications of this anomaly alone are staggering. The differences between inductive and deductive strategies and the implications of each will be discussed in greater detail in the treatment of the curriculum.

Summary

Our analogies and metaphors often provide significant insights to our thinking. The primary metaphor for the old paradigm, based as it is on Newtonian and Cartesian thinking, is the machine. Newton thought of the universe as a giant clock. When extended to the way we think and learn, this metaphor suggests that the mind functions like a giant computer. Thus, we logically conclude that just as a computer or any machine must be programmed before it can function, so students must be programmed by the teacher, who is then perceived as the master programmer.

And just as the potential capacity of a computer can be quantified by an appropriate number of bytes, so the potential of a child to learn can be quantified by a mathematical score. The underlying assumption is: only that which can be

quantified and measured empirically is real. As an extension of this manner of thinking, we organize our schools like factories and emphasize the necessity of treating each child in the same way, as though they were interchangeable cogs. Through all of this, we expect children to be efficient learners and to produce that which is measurable and quantifiable. It is indeed one of the great ironies of our time, that having designed computers that can perform the function of information storage and retrieval better than any human, we continue to emphasize information storage and retrieval in our teaching and testing.

The metaphors of the new paradigm are organic. Just as some scientists are now referring to the earth as the largest single, living organism we know, so an appropriate organic metaphor for a child is that of a seed. Just as every acorn has within it the potential to be an oak tree, every child has the potential to be a genius. As Katharine Kersey (1983) suggests, "They (children) come to us like a packet of flower seeds, with no pictures on the cover, and no guarantees. We don't know what they will look like, be like, act like, or have the potential to become." Pursuing this metaphor, she likens parents (and teachers) to gardeners whose job it is to "give proper nourishment, love, attention, and caring, and to hope for the best. The gardener learns to be 'tuned in' to the plant.... He knows that all plants are different, need varying amounts of care and attention, and grow at different rates of speed."

Research is just beginning to explore the depths of human potential in the areas of mind/brain, and thinking/learning. Therefore, the evidence is not all in and many conclusions are tentative. However, there are two conclusions about which there is absolutely no doubt. The first is that many of the assumptions on which education today is based are no longer valid. The second is that each individual has enormous untapped potential for thinking and learning which, at least at present, is beyond measurement. If we are to adequately prepare children to live in the global information society of the twenty-first century, the first step is to acknowledge the paradigm shift that is occurring. Once this has taken place, we are ready to design the most cre-

ative strategies we can devise, which will enable students to "tune into," explore, and tap their unrealized potential for thinking, learning, and creative problem solving. This then becomes the primary responsibility for teachers.

TEACHERS

The paradigm shift vis-a-vis teachers is directly related to the shift in assumptions concerning the nature of intelligence, thinking, and learning. At its most fundamental level, it is a shift from the perception of the teacher as a technician to a recognition of the teacher as a professional.

The Old Paradigm

The national report, *A Nation At Risk*, recognizes that the teacher is not perceived as a professional when it states: "Individual teachers have little influence in such critical professional decisions as, for example, textbook selection" (National Commission on Excellence in Education, 1983). Before we can address the problem, we must explore the assumptions that underlie the current role of the teacher in the educational system.

Many authorities now recognize that, like it or not, one of the major functions of schools in our society is custodial. The result is that the primary responsibility for most teachers is to be an effective caretaker of children, i.e., classroom manager. Responsibilities include such diverse elements as discipline, collecting lunch money, making announcements, keeping students busy with seat work, grading essays, entertaining the students, and lecturing. Above all, the teacher must keep the students quiet lest the principal walk in unannounced. While an increased emphasis on "time on task" has, perhaps, increased the amount of time given to the curriculum, the focus is still primarily on management.

Once we move beyond the classroom management function, teaching is perceived as being virtually synonymous with lecturing. John Goodlad (1984) estimates that as much as eight-five percent of classroom time is spent by the teacher talking to students. Although we have known for a long time that listening is the poorest way to learn, we still

tend to equate good teaching with an interesting and entertaining lecture. Implicit in this perception is the assumption that the best teachers are those who are the best purveyors of knowledge. Because they are perceived as the "font of wisdom," many teachers discourage questions for which they may not have the answer, maintaining tight control on what content is studied and how it is addressed. It is not difficult, then, to recognize the truth in Carl Rogers' belief that we tend to equate presentation with learning (1967).

Though they are trained as professionals, teachers have little voice in selecting what they will teach, and, except within narrow limits, how they will teach it. In the words of one teacher, Patricia Dombert,

We affect none of the key elements in our working lives. For example, we have no control over class size or the length of the school day and class periods. We have almost no input into the form and content of report cards. We do not select our schedule, grade levels, or the buildings in which we teach. Indeed, we do not even control the time within our own classrooms, for we are slaves to the P.A., to notes from the nurse, from guidance, the librarian, the main office. (Dombert, 1985)

Another fundamental assumption that is explicitly accepted throughout the educational system is that teachers are primarily motivated by external rewards such as salary and career status. Most responses to the call for improvement of teaching have focused on these two issues. *Educational Leadership* (November, 1985) devoted an entire issue to the topic, "Making Teaching More Rewarding." Every major article discussed career ladders and salary scales. The single voice in the wilderness of external reward systems, was that of Patricia Dombert, the only classroom teacher to contribute to the issue. Her conclusion, which is reinforced by my own experience with teachers, is unequivocal. Given a choice, most teachers would prefer to participate in the major decisions that shape their professional lives, rather than be "bought off" by financial remuneration. While this does not negate efforts to upgrade teachers' salaries, it does suggest that intrinsic personal and professional satisfaction is more important than extrinsic rewards.

The New Paradigm

The fundamental assumption of the new paradigm vis-a-vis teachers, is that the teacher is a professional. Someone has suggested that there are four qualities that characterize the professional: vision, training, responsibility, and accountability. I have found, as has Patricia Dombert, that most teachers have a vision. Having entered the profession for what she calls a "love of subject and students," teachers share common ideals about what constitutes good teaching and effective learning. In my workshops, I find that teachers know what good teaching is and describe the "ideal" classroom without hesitation. They do have a vision, and their outstanding frustration is their perceived inability to make that vision a reality. As Dombert says so eloquently, "The paradox of education as a profession is that it attracts people with visions into a system designed to frustrate those visions" (Dombert, 1985).

A second quality of a professional is training. While I have some major criticisms of much that goes on and does not go on in teacher education programs, my experience suggests that most teachers have acquired the fundamental knowledge and skills requisite for being a professional. In fact, I have found that most of them have knowledge and skills that haven't been used yet. For example, in my workshops, teachers design curriculum units that are always more appropriate for their students than the textbooks they use.

Responsibility goes hand in hand with ownership. In fact, one of the fundamental precepts of our capitalistic democracy is that ownership provides the best motivation for success. A recent poll indicates that the "dream job" for forty-seven percent of women and thirty-eight percent of men was to be head of their own businesses (John, 1986). Professionally, ownership involves full participation in the decisions that influence one's work. Inherent in such participation is both the responsibility and accountability for implementing those decisions. Until teachers are allowed to assume the responsibilities of a professional, a genuinely professional system of accountability is not possible. Teachers resist merit pay plans because they know that in a system where their responsibilities are se-

verely limited, good survival strategies are more often rewarded than are provocative teaching strategies.

Once we acknowledge a new set of assumptions regarding the innate capacities of students, a new role for the teacher emerges. From being a dispenser of information and knowledge, the teacher becomes a gardener whose responsibility is to nurture growing children, so that the innate potential of each organism is allowed to blossom and bear fruit. Another provocative metaphor with which to describe the teacher's function is that of the whetstone. Just as a whetstone does not cut, but rather sharpens steel, so the teacher does not teach, but sharpens and hones the natural "edge" of the brain.

One currently popular response to the perceived need for improving teaching is "mentorship." In such programs, new teachers are placed under the supervision of more experienced teachers. While this idea has merit, I have found that one of the most productive ways to improve teaching is to provide time for teachers to think, plan, share ideas, and write with their grade level or subject area colleagues. Unfortunately, teaching is perceived as such an independent, isolated function, that few teachers expect time to work cooperatively with colleagues. One of the comments I hear most often from teachers following a "contextual thinking" workshop is how much they appreciated the opportunity to spend a weekend thinking, talking, and writing curriculum units with colleagues. Unfortunately, after the workshop they return to a system that allows no time for such professional development.

Summary

I am convinced that teachers represent the greatest untapped resource in education today. For one thing, they have a vision that relates specifically to the teaching/learning process. Second, most of them are proficient in the pedagogical skills of classroom management and know their subject matter. In addition, they know and care for their students and recognize, better than most, what their true needs are. As one high school teacher said on the first day of a workshop, "I am so frustrated because I see so much potential sitting out in

front of me going to waste. I don't know what to do about it." Like her, they are eager to be given the primary responsibility to do the job that is required. Once they are treated as professionals, they will be willing to be accountable as professionals.

However, they, too, are victims of an educational mindset that goes against what many of them intuitively know. They feel powerless when, in fact, they have far more power than they know. One of the interesting results of "contextual thinking" workshops is the empowerment of teachers that takes place. By the end of the workshop, participants freely acknowledge that they have everything that is necessary to accomplish approximately ninety percent of what they always wanted to accomplish without additional permission, money or time.

What has happened to empower them? First, they have been exposed to a set of assumptions about themselves and students which reinforce their own intuitive sense of what they are about. Second, their professional competence has been enhanced as they re-design their curriculum so that it is relevant to the needs of their students and the realities of our global information society. The one thing they desperately need, on a continuing basis, is a support network that provides them with ideas and the encouragement to try these ideas. This leads us to the next arena, the administration.

ADMINISTRATION

At its most basic level, the shift in paradigm vis-a-vis the administration of our educational system is a shift from top-down management to bottom-up management. In a bottom-up school district, the major responsibility and accountability for decisions related to teaching and learning are in the hands of the classroom teacher.

The Old Paradigm

School administration, with few exceptions, is organized in a traditional, bureaucratic, hierarchical structure. The power is at the top. The school board and superintendent exert control and make most of the decisions concerning organization structure, personal budget, curriculum, and classroom management. This model worked well when

the stated purpose of education was to provide public education for the masses in a time when social change was relatively slow. It is questionable whether such a system is viable in a complex society where change and diversity are accentuated.

Yet, little has changed in the way our educational system is structured. Still very much a top-down organization, it is operated according to the traditional factory model. In spite of the current research related to organizational theory, and the impact of new management strategies in the private sector, that knowledge and experience has had little influence on how schools are organized and conducted. Although many superintendents are both conversant with and nominally supportive of this new approach to management, few seem ready to explore the implications of these theories for their own organizations.

The New Paradigm

Stan Davis of Boston University calls for a new paradigm of management when he states, "Just as farms were not appropriate models for factories, the factory organizational model is not an appropriate model for information age organizations" (Davis, 1982).

Schools, along with many other organizations, are in desperate need of new management models. Perhaps more than other organizations, schools should be dedicated to fulfill the organizational purpose set forth in an unpublished speech by Peter Drucker at the National College of Education. When we substitute the word "school" for "organization," we have one of the most challenging definitions of a school that I have ever seen. "The [school] is a human, a social, indeed, a moral phenomenon. . . . The only meaningful purpose of [a school] as a social and human institution is to make the strengths of individuals productive and their weaknesses irrelevant."

Drucker's statement makes the most sense when it is understood in a systematic context. My colleagues and I have developed a series of systems models based on the principles of general systems theory and ecology. The organizational model is particularly appropriate for schools because it highlights the two most controversial aspects of

management, responsibility and accountability. The model is based on an ecological strategy that William Ophuls (1977) calls "macro-constraints and micro-freedoms."

The essence of the model is that, beginning at the top, the school board establishes the macro-constraints within which the superintendent must function. These constraints are primarily four in number: goals, outcomes, time frame, and money. This means that the superintendent is expected to work toward goals established by the school board, and achieve the requisite outcomes within a given time frame and with the designated resources. Within these parameters, he is given the responsibility and freedom to function as a professional. In this model, the school board does not become involved in the decisions that are the responsibility of the superintendent. His accountability is based on his ability to provide the leadership required for everyone to function optimally within this framework.

At the next level, the superintendent establishes the macro-constraints within which each principal functions: again, goals, outcomes, time, and resources. Within these constraints, each principal assumes responsibility for educational leadership, management style, and organizational structure within his or her school. Accountability is based on the principal's ability to create a productive learning environment. At this level, each principal identifies the macro-constraints within which classroom teachers will be held accountable. Within the broad constraints of district-wide goals, desired learning outcomes, time frame, and resources, teachers are allowed, and indeed encouraged, to decide on teaching methods, textbooks, curriculum structure, and classroom management. Their accountability is based on their ability to function effectively as professionals within the identified constraints.

When carried to its logical conclusion, this strategy is applied by the teacher in the classroom. The teacher identifies the macro-constraints within which students can freely explore their own potential for thinking and learning. Students know the goals, expected outcomes, and other constraints that may be appropriate at this level, such as classroom discipline. Within these constraints, students,

in order to freely explore their individual potential for thinking and learning, are expected to assume primary responsibility for their own learning.

This is a bottom-up model. Responsibility and accountability are perceived as interdependent and are built into the system. Individuals at each level are given appropriate responsibility and challenged to creatively approach their tasks in a manner and style best suited to their interests, knowledge, skills, and goals. Accountability at each level is based on the degree to which this responsibility is exercised. When applied in the classroom, this model places the primary responsibility for learning where it belongs—on the student. In such a classroom, each student is encouraged to develop the skills required to become a responsible, lifelong learner.

Summary

It is questionable whether or not significant educational reform can take place without changes in the system as a whole. The chances that this will occur seem, at first glance, slim. As one observer commented, "Schools are among society's most entrenched and obdurate organizations when it comes to institutional change—rivalled only, perhaps, by correctional facilities" (Sirotnik, 1985).

On the other hand, the most hopeful feature of public education in America is its decentralized nature. Individual superintendents who recognize that a major paradigm shift is in the making in education as elsewhere, have the opportunity and freedom to work independently for change in their schools. One difficulty they face is that there are few organizational and management models that reflect the assumptions of the paradigm. Since the reward system reinforces traditional rather than risk-taking behavior, the tendency is for superintendents and teachers alike to take whatever new ideas come along, and force them into the old structures. We forget that new wine requires new wineskins.

While many administrators and teachers disagree with the current sentiment at the federal level for voucher plans, I think that the competition of the marketplace in some form may be the salvation of public schools. For example, competi-

tion within a school district could be encouraged within the macro-constraints of the systems model described above. The principal and teachers in each school would be encouraged to design creative educational programs that reflect their unique knowledge, skills, and teaching styles. Such a plan would provide parents and students with a variety of options. The principal and teachers of each school would be responsible for implementing their program, and held accountable for its success. Fundamental to that success must be a curriculum that is integrated, interesting, provocative, and relevant—in short, a curriculum that addresses both the opportunities and dangers of the global crises that are inherent in the “real” world described by physicist Fritjof Capra.

Today we live in a globally interconnected world in which biological, psychological, social, and environmental systems are all interdependent. To understand this world appropriately, we need an integrated perspective which Cartesian thinking simply does not offer. (Capra, 1982)

CURRICULUM

The paradigm shift vis-a-vis the curriculum is a shift from the fragmentation to the integration of thinking, teaching, and learning. The present status of the curriculum can be best summarized by an analogy.

Getting an education is like putting together an ever-expanding jigsaw puzzle. Students spend years memorizing the shapes, colors, and sizes of as many pieces as possible. They learn to collect and sort the pieces into appropriate piles, each of which has a label—math, science, history, art. Occasionally they may fit a few pieces together. However, because they seldom receive more than a few hints as to what the puzzle is all about, they have no frame of reference for understanding how the individual pieces fit together. Without some context to aid their understanding, the pieces they have collected are essentially meaningless and, therefore, useless.

This fragmentation of learning is the direct result of the analytical, reductionist perspective of the old paradigm. What is ignored by this perspective is

that it is the picture of the puzzle that helps one make sense of the pieces. Apart from the context provided by the picture, there is nothing intrinsically valuable about any single piece of a jigsaw puzzle by itself. I refer to this as the “peephole approach” to education.

Every child knows that the first step in putting together a jigsaw puzzle is to look at the picture because it is the picture that tells you what to look for and how the pieces fit together. The picture tells you whether the red piece is a part of a firetruck, a flower, a barn, or something else entirely. It is this integrated, holistic, systemic, contextual perspective of the new paradigm that I call the “picture window” approach to education. It is this perspective that is crucial for achieving the educational mission set forth by the Carnegie Foundation for the Advancement of Teaching (Boyer and Levine):

“THE GOAL OF COMMON LEARNING IS TO UNDERSTAND THE CONNECTEDNESS OF THINGS.”

When referring to the curriculum, we are discussing two basic issues. One is the way the content is organized or structured, and the other is the nature of the content itself. What we shall see is that these two factors, structure and content, are inextricably linked together and reflect some fundamental assumptions about the relationship of information or data to knowledge. Since together these shape the methodology of teaching and learning, it is crucial that we explore the implications of both the old and new assumptions on the structure and content of the curriculum.

Curriculum Structure

To discuss the way curriculum content is organized and structured is to talk about the relationship between information (the pieces of the puzzle) and knowledge (the picture). Traditionally in Western thought, the primary starting point for structuring knowledge has been to begin with the smallest self-evident parts (information), and proceed from these parts to incrementally construct the whole (knowledge). This inductive approach is based on the Cartesian assumption that the whole is equal to the sum of its parts and thus can be predicted and

extrapolated from the parts. Based on this assumption, it is logical to conclude that the parts have intrinsic value in and of themselves, and that the primary purpose of education is to provide students with as many pieces of the jigsaw puzzle as possible. As a consequence, we teach facts as the building blocks of knowledge.

Almost without exception, our curriculum is organized inductively. For example, every biology textbook begins with a study of the cell and concludes with a study of the ecosystem. As every student who has taken an introductory biology course knows, what you try and remember are facts, e.g., the parts of a cell, the parts of a frog, the parts of a flower. Because these facts are perceived as the foundation on which any later learning will be based, it is assumed that both the science major and the liberal arts student, who is only surveying the sciences, must accumulate the same building blocks as a starting point for understanding biology.

This fragmented perspective has shaped our entire educational system. It is reflected in the division of knowledge into academic disciplines, each of which continues to be divided into increasingly discrete units. These units are divided into discrete classes where discrete facts are presented to be recorded and memorized for recall in a cumulative fashion. As a result, when a high school history teacher makes reference to something from science, the typical response is, "What has that got to do with history?"

Because it is explicitly taught in our schools, this fragmented perspective forms the conceptual framework for most adult thinking. For example, in a recent workshop, a group of middle managers of a multi-national corporation acknowledged that one of the most difficult problems they faced in their own corporation was the fragmented mindset that compartmentalized jobs and responsibilities, so that no one—except perhaps the Chief Executive Officer—saw the entire picture. Because the way we think shapes the way we respond to the demands of our daily lives, we can only conclude that we are educating people to think in fragmented ways and thus, to live fragmented lives in an increasingly fragmented world. This fragmented

thinking may be the most devastating legacy of the Cartesian perspective.

A HOLISTIC CURRICULUM

There is a second starting point from which knowledge can be structured. The deductive approach is based on the assumption that "in order to understand anything we must have a sense of the fundamental connections which form the backdrop of all existence" (Salk, 1983). It begins with the whole which provides a context within which the parts, as they are learned, can be understood in relationship to each other and to the whole. From this perspective, it is clear that the whole is greater than the sum of its parts, so that without an understanding of the whole as a context to endow them with meaning, the parts are essentially worthless. As Professor I. K. Taimni puts it: "A mass of unrelated and unconnected facts is a mere rubbish heap. Discover the underlying principle which connects those facts and it becomes valuable material which can be utilized in innumerable ways" (Taimni, 1969).

This deductive strategy for organizing information follows what appears to be the natural mode of thinking and learning which always starts with the context as a frame of reference within which the parts can be taught, understood, or deduced. Described earlier, this process seems to involve a movement from right hemisphere (context), to left hemisphere (content, i.e., details), to the forebrain (conclusion, i.e., evaluation and decision making). Thus, in the new paradigm, emphasis is given to context as a frame of reference for understanding content. Alvin Toffler recognized that this was one of the major characteristics of the new paradigm. He wrote: "We are moving from a ... culture that studies things in isolation from one another to a ... culture that emphasizes context, relationships and wholes" (Toffler, 1980).

What should be clear is that the way knowledge is structured determines the nature of the content of what is studied. Hilda Taba (1982) provides a taxonomy of knowledge that helps us understand the relationship between structure and content. She identifies four levels of knowledge: thought sys-

tems, concepts, basic ideas, and facts. When this taxonomy is viewed inductively, facts, as the building blocks of knowledge, are the starting point of learning. When viewed deductively, the starting point is the thought system, i.e., the "big picture." From this big picture, concepts, basic ideas, and facts that are relevant to the topic at hand can be deduced. If we compare the structure of knowledge with the structure of a house and think about building knowledge like we build a house, this difference in perspectives becomes clear.

Thought systems = Blueprints

Concepts = Framing: Joists and studs

Basic ideas = Walls and room dividers

Facts = Furniture

The blueprint provides the big picture, the overview that shows how all of the parts fit together. The blueprint literally provides more knowledge with less information. One does not build a house without a blueprint. But, once one has seen the blueprint, one can deduce where the joists and studs belong. And, once the framing has taken shape, the walls and room dividers become evident. Only then does one select the furniture.

This analogy suggests that even inductive thinking assumes a blueprint or plan. One does not take a pile of bricks and, willy-nilly, begin to build. There is always at least a mental image or plan of what one wishes to build. In reality, the present emphasis on facts as the building blocks of knowledge, without some context to provide meaning is, at best, a spurious representation of genuine inductive thinking.

Curriculum Content

In a world where the amount of available information is estimated to double every five years, one of the most significant and controversial questions facing educators is the question: "What should all students learn?" If the response to this question is based on the Cartesian paradigm, they are caught in an almost intolerable double bind. Forced to choose from the virtually infinite amount of facts and information, educators invariably select math and science and eliminate music, art, and environmental education, not because the latter are perceived as being unimportant, but because

schools can't teach everything. As long as curriculum content decisions are based on the old assumptions, which highlight the importance of facts, educators will be forced to make either/or choices among a smorgasbord of subjects, each of which is rightly considered by someone to be of primary importance.

When the question of what all students need to know is addressed from the perspective of the new paradigm and its assumptions, one reaches a different conclusion. Students need to know the "big picture" as the context within which relevant facts can be selected, organized, and used for understanding, problem solving, and decision making. It is this knowledge that enables one to turn facts into valuable knowledge.

Taba's taxonomy provides us with an answer to our question. Students need to know the underlying principles and concepts that make up the structure of thought systems and that help us make sense out of the world. Because a concept is often worth a thousand facts, through an understanding of these fundamental concepts and principles students can literally "know more with less" information.

This is not new. Jerome Bruner identified the need for teaching the structure of knowledge and insisted that students could be taught the structure of a subject, i.e., its fundamental concepts, in some form, at any age. His proposal of a spiral curriculum was based on such a structure (Bruner, 1960). Research has made it clear that when concepts are taught first, as a structure for learning, retention of detail is eighty percent higher than when facts are presented in the more traditional way (Gurley, 1982). On the other hand, when concepts are taught as additional facts to be memorized for recall rather than perceived as cognitive structures for understanding "the connectedness of things," their usefulness is severely limited.

In "contextual thinking" workshops, teachers are provided with models and strategies for identifying and teaching structure as the context within which relevant facts can be learned. One high school social studies teacher designed a curriculum unit on the Great Depression which was organized around four interdependent concepts fundamental to

social studies as a discipline: political, social, economic, and ecological. After identifying additional sub-concepts that were relevant to each of these four major concepts, he found that he had designed a basic structure based on twenty-five concepts that could be used to study any period in any society or culture. Once the students understood these basic concepts, they had the framework and tools with which to select, organize, and analyze, compare, contrast, or synthesize the facts that were relevant to the particular social studies topic or issue studied. One might presume that when students taught like this are ready to vote, they will be better prepared to recognize and understand the interdependent nature of all political, social, economic, and ecological systems. In short, they "understand the connectedness of things."

Summary

One thing can be said about the curriculum without danger of contradiction. If it is not inherently interesting, substantive, provocative, and relevant, effective learning will not occur. No amount of money, training, classroom management skills, organizational strategies, teaching methodology, or external reinforcements can lead to effective learning without a curriculum that stimulates the interest and captures the imagination of the students, and, not so incidentally, of the teachers. Many studies verify the fact that most students and many, if not most, teachers are bored, frustrated, and often angry about having to "put in time" when nothing of significance takes place. On the other hand, when students and teachers are both genuinely interested in the subject matter, external factors take on secondary significance.

The key to designing a curriculum that meets this criterion is integration and context. Inherently, a curriculum that focuses on the learning of facts without a context to give them meaning is neither interesting, substantive, provocative, nor relevant. Most curricula are based on textbooks which, because they reflect the assumptions of the Cartesian paradigm, focus on facts. The irony is that while there seem to be few educators who really like the available textbooks, they complain but do nothing to change it.

I believe that what is needed more than anything else is a curriculum that will stimulate the imagination of both students and teachers, and challenge them to think deeply and become profoundly involved in some of the significant issues in life. This is why we encourage teachers to design curriculum around "questions worth arguing about." Using "contextual thinking" models and strategies, one private school re-designed its entire K-8 curriculum around the "question worth arguing about": "What does it mean to grow up in a global information society?" (Unified Catholic Parish School, 1987). The curriculum for various age and grade levels was designed around such questions as "How am I a member of many families? (K-1)" "What are the patterns that make communities work?(2,3)" "How do humans and cultures evolve and change? (4,5)" and "How does one live responsibly as a member of the global village? (6,7,8)." Each of these questions was explored from various perspectives—the humanities, the natural sciences, the social sciences, and, because it was a private school, the religious. Vertical articulation was based on ten fundamental concepts that spiraled through the entire curriculum.

CONCLUSION

The traditional purpose of education in any culture has been to transmit to each succeeding generation the stored knowledge of that culture. In our nation of immigrants, the goal of mass public education was to build a common storehouse of meaning based on shared knowledge. Given this context, the assumptions that shaped our educational system were appropriate to its mission. Needless to say, that mission was highly successful.

But almost without our knowing it, the primary mission of education has changed. Today, there is common agreement that the mission of education is to provide students with the knowledge and skills required for "learning how to learn." What has not been recognized is that this new mission requires both a new content and a new process for education. And because content and process are so interdependently woven together, they cannot be addressed in the former, fragmented, piecemeal

fashion. In short, what is needed is a new curriculum and a new teaching/learning methodology based on a new set of assumptions about human potential. Instead, what we have done in the name of educational reform has been to take a few exciting new programs based on a new set of assumptions and force them into the old mold. The result is that the new programs are either watered down or soon dropped because they do not work. It's the reform movement of the 1960s all over again. We keep trying to pour our wine into old wineskins.

The first step in addressing the new mission is to acknowledge the emergence of a new paradigm for education. Contrary to much that has been written about the inadequate preparation of teachers, my experience with thousands of teachers suggests that most of them are open to new ideas and ready for substantive change. For the most part, they have the training, experience, qualifications, and desire to design and teach a curriculum that will address the new mission of education. They require two things. The first is administrative leadership and support structures that not only recognize the need for change, but encourage the teachers to assume both responsibility and accountability for what happens in the classroom.

Second, they require integrated, holistic, contextual models and strategies with which to turn their present curriculum into one that is integrated, interesting, substantive, provocative, and relevant to

the real world. As a teacher at one of our state's most prestigious high schools said to me, "Everyone out here is talking about curriculum integration but no one knows how to do it."

A simple strategy for change involves four steps.

1. Strong initiative by the superintendent and a willingness to provide the management and support structures that are required.
2. The recognition that the key to quality teaching and learning is the teacher, and that ownership is the best motivator for professional development.
3. Providing the training required for teachers to design a curriculum that is integrated, interesting, substantive, provocative, and relevant.
4. Keeping the focus at the individual building level. The cost is low and the potential impact is great.

A major paradigm shift is taking place. Chances are that by the year 2000 we will have a vastly different system for educating our children. If this is to occur, however, we must explore both the old and the new assumptions relating to every facet of the educational process. Only then can we determine those which are most appropriate to the needs of young people who will spend most of their lives in the twenty-first century.

REFERENCES

- Bloom, B. (1984, May). The search for methods of group instruction as effective as one-to-one tutoring. *Educational Leadership*.
- Boyer, E., & Levine, A. *A quest for common learning*. Washington, DC: The Carnegie Foundation for the Advancement of Teaching.
- Bruner, J. (1960). *The process of education*. New York: Vintage Books.
- Capra, F. (1982). *The turning point*. New York: Columbia University Press.
- Davis, S. M. (1982, January/February). The case of the missing management model. *The Review*.
- Dombert, P. (1985, November). The vision of an insider: A practitioner's view. *Educational Leadership*.
- Even, M. J. (1981). *The functions of brain lateralization in the process of adult learning*. Paper presented to the National Conference on Research in Adult and Continuing Education.
- Gardner, H. (1984). *Frames of mind*. New York: Basic Books.

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- Goodlad, J. (1984). *A place called school*. New York: McGraw Hill.
- Gregorc, A. (1982). *Style delineator*. Maynard, MA: Gabriel Systems.
- Gurley, L. I. (1982). *Use of Gouin's vee and concept mapping strategy to teach responsibility for learning in high school biological sciences*. Unpublished doctoral dissertation, Cornell University, Ithaca, NY.
- Hart, L. A. (1983). *Human brain and human learning*. New York: Longman.
- Howard, N. (1981, September 28). [Untitled article]. *Leading Edge Bulletin*, 11(3).
- John, K. E. (1986, June 30). Dream jobs. *The Washington Post Weekly Edition*.
- Kersey, K. (1983). *Sensitive parenting*. Washington: Acropolis Books.
- Loye, D. (1983). *The sphynx and the rainbow*. Boulder: Shambhala.
- Mager, R. F. (1962). *Preparing instructional objectives*. Palo Alto: Fearson Publishers.
- National Commission on Excellence in Education. (1983). *A nation at risk: The imperative of educational reform*. Washington, DC: U.S. Department of Education.
- Neustadt, R., & May, E. (1986). *Thinking in time: The uses of history for decision-makers*. New York: The Free Press.
- Ophuls, W. (1977). *Ecology and politics of scarcity*. San Francisco: W. H. Freeman.
- Perkins, D. (1984, September). Creativity by design. *Educational Leadership*.
- Postman, N., & Weingarten, C. (1969). *Teaching as a subversive activity*, (pp. 93). New York: Delacorte Press.
- Rogers, C. (1967). The facilitation of significant learning. In S. Siegel (Ed.), *Instruction—Some contemporary viewpoints*. New York: Chandler Publishing.
- Salk, J. (1983). *Anatomy of reality*. New York: Columbia University Press.
- Sirotnik, K. A. (1985, November). Let's examine the profession, not the teachers. *Educational Leadership*.
- Taba, H. (1982). *Curriculum development: Theory and practice*. New York: Harcourt, Brace and World.
- Taimni, I. K. (1969). *Man, god and the universe*. Wheaton: Theosophical Publishing House.
- Toffler, A. (1980). *The third wave*. New York: William Morrow.
- Unified Catholic Parish School. (1987). *What does it mean to grow up in a global information society?* Beaver Dam, WI: Unpublished curriculum.

GLOBAL THINKING IN THE CONTEMPORARY SCHOOL

Terry Stirling

A DEFINITION OF GLOBAL EDUCATION or "Why do we have to learn this?"

What exactly is global education and what does global thinking have to contribute to the classroom of the future? Can global education promote thinking patterns that make sense to students? Students who live in our electronic age often ask their teachers, "Why do we have to learn this?" This question is most often asked, and appropriately so, when students are mastering what they perceive to be isolated, truncated, and often parochial terms and bits of information. Can one blame students for wanting to connect information with broader ideas and systems? With their entire adult future ahead of them, why wouldn't students crave explanations about the world as they perceive it, however vaguely? The world they see on television and in videos, and the world they live in outside of school, has priorities that are dissonant with the priorities in textbooks. Why shouldn't schools assist students in their desire to make sense of their place in the world and their desire to predict their own future? How do schools benefit by tenaciously clinging to past practices?

For more than twenty years American global educators have been loosely organized and have been in general agreement as to what constitutes global education (Kneip, 1985, p. 2). They acknowledge that the world is an interdependent network of systems that do not conform to political boundaries. Global educators examine reality from multiple perspectives that transcend cultures. And they are proud to believe in and act upon universal values such as peace, human rights, and respect for the environment.

Although there is no official definition of global education, there is general agreement and little controversy among its proponents over the meaning. Probably the most commonly cited definition is that written in 1976 by Robert Hanvey in *An Attainable Global Perspective*. He refers to the following dimensions:

- **Perspective Consciousness:** the recognition of awareness on the part of the individual that he or she has a view of the world that is not universally shared, that this view of the world has been and continues to be shaped by influences that often escape conscious detection, and that others have views of the world that

CONTENT	SKILLS/CONCEPTS	VALUES
area studies	systems thinking	peace
foreign language	multiple perspectives	human rights
war/peace studies	interdependence	literacy
hunger/nutrition	cooperation	education
environment	comparison	health
sexism	development	diversity
racism	conflict resolution	
colonialism	research	
	modernization	
	social action	

Figure 1 Three Categories of Global Education

are profoundly different from one's own (Hanvey, 1987, p. 85).

- **'State of the Planet' Awareness:** awareness of prevailing world conditions and developments, including emergent conditions and trends, e.g., population growth, migrations, economic conditions, resources and physical environment, political developments, science and technology, law, health, inter-nation and intra-nation conflicts, etc. (Hanvey, 1987, p. 87).
- **Cross-Cultural Awareness:** awareness of the diversity of ideas and practices to be found in human societies around the world, of how such ideas and practices compare, and including some limited recognition of how the ideas and ways of one's own society might be viewed from other vantage points (Hanvey, 1987, p. 89).
- **Knowledge of Global Dynamics:** some modest comprehension of key traits and mechanisms of the world system, with emphasis on theories

and concepts that may increase intelligent consciousness of global change (Hanvey, 1987, p. 94).

- **Awareness of Human Choices:** some awareness of the problems of choice confronting individuals, nations, and the human species as consciousness and knowledge of the global system expands (Hanvey, 1987, p. 103).

A complementary definition written by the Center for Human Interdependence states:

Global education involves learning about those problems and issues that cut across national boundaries, and about the interconnectedness of systems—ecological, cultural, economic, political, and technological. Global education involves perspective taking—seeing things through the eyes and minds of others—and it means the realization that while individuals and groups may view life differently, they also have common needs and wants. (Tye, 1990, p. 163).

As illustrated in Figure 1 above, global educators often classify global education into three useful ar-

eas for curriculum development—content, skills, and values.

These loose definitions of Global Education describe a field that motivates students because it corresponds to a world that seems real to students. These concepts are useful to students who wish to make sense out of the knowledge with which they are presented in school. And global values appeal to the moral nature of students, as well as to their instinct for self-preservation.

PERSPECTIVE CONSCIOUSNESS AND THE CURRICULUM or "We never got past the Second World War."

Global education recognizes the vast international storehouses of human knowledge. Ninety percent of all the scientists and engineers who have lived on earth are practicing now. Our scientific knowledge at least doubles every fifteen years. And if all the students preparing to be scientists and engineers today fulfill those ambitions, we can expect twice as many scientists and engineers as we have today (Balk, 1990, p. 15). Librarians are busy worldwide cataloging new books, articles, films, photographs, videotapes and videodiscs, computer programs, recordings, and artifacts. World literature is increasingly available in translation. History, by definition, encompasses all of the human record. Why, then, might a teacher feel absolutely compelled to finish one particular textbook of scientific topics, or one history book, or one particular anthology of literature? Why is it important to learn the causes of the French and Indian War out of the multitude of wars that exist and have existed?

When human knowledge is seen in perspective, global education becomes very liberating. When one considers the mass of knowledge available, requiring that students learn a particular subset of that knowledge seems far less important than it used to. This is not to imply that the converse of this reasoning is true and that students need not learn anything. Rather, understanding becomes paramount. What students do learn should be understood through rigorous thinking. Knowledge

should mean something to the student. This implies that the student can relate it to other knowledge, can subsume it in larger contexts, and can explain his or her thinking about the knowledge. When knowledge is understood, it is typical that even though a student may forget some details and supporting facts, he or she will recall the bigger picture and be able to enlarge on a world view when more related information is added. When knowledge is not understood, students typically forget both the details and the major ideas, and teachers feel compelled to "reteach."

As a corollary, when knowledge is not understood and when classroom subject matter is not intellectually engaging, students are denied the opportunity to practice basic skills. One becomes proficient in basic skills through the art of communication. Shortcomings in the basic skills augment the amount of time that teachers feel they must "reteach," and contribute to the overwhelming trend in American schools to simplify school work and track students. Boredom comes full circle.

The vehicles that serve to limit students' knowledge are textbooks, worksheets, and other commonly used curricular materials, which appear quaintly out of date. Textbooks are among the least intriguing formats available to students. Why is it that adults don't consult textbooks on a more regular basis? The bulk of the curricular materials in use today stress information and definitions drawn from a small, often parochial knowledge pool presented in a passé format which is not commonly used in adult society.

Educators have access to a wealth of global teaching materials that are mainly designed to complement the existing curriculum. Global curriculum offerings are usually relatively inexpensive, reproducible, and formatted for student interaction. By examining catalogs and curriculum indexes, teachers can imagine how to transfer the concepts presented to their own classroom teaching sequences. Freed from the constraints of the traditional curriculum, content may be chosen for a variety of reasons such as student or teacher interest, multicultural interests, integration with other parts of the curriculum, and inherent quality.

The bulk of global materials have been developed by educators with a mission and this human caring tends to have a personal effect on the students who have the benefit of using them. A unit on Chinese calligraphy, for example, may have been written by a sinophile who has lived in China or by a native Chinese. African folk tales for young children may have been collected by a person who lived for a time among African families. Units on peace, understanding cultural diversity, and on global warming are most likely written by individuals with strong personal commitments to world peace and the preservation of the planet.

Perhaps perspective consciousness starts at home with a view of our own curriculum. Indeed, our current American concept of the curriculum is a matter of particular perspective, and is not a universally shared ideal one. Henry Miller's biographer's account of Miller's short-lived college education at City College in New York City during the early part of the twentieth century comes to mind:

"Henry enrolled in September, but his college career lasted only six weeks. He decided that if reading 'Hermann und Dorothea' or 'John Gilpin's Ride' constituted an education, he didn't want one. When he had to read *The Faerie Queene* he became convinced that he was in a madhouse" (cited in Dearborn, 1991, p. 42).

THE STATE OF THE PLANET or "Would we surely win a war if we were fighting on our own soil to protect women and children?"

Being aware of the state of the planet has much to do with change. We used to believe that human beings were meant to have dominion over all other living things—that progress meant conquering our environment and bringing it under our control. Now we realize that we must live in harmony and balance with all other living things. We haven't really conquered nature at all. We have poisoned the earth, and we humans are in danger of extinction. Ironically, nature is about to conquer us unless we act. In order to act we must first shift our thinking. That is global awareness.

What we seem unwilling or unable to recognize is that our entire modern world is itself inspired not by a rational process, but by a distorted dream experience, perhaps by the most powerful dream that has ever taken possession of human imagination. Our sense of progress, our entire technology society, however rational in its functioning, is a pure dream vision in its origin and in its objectives (Berry, 1990, p. 205).

In our zeal to harness the forces of nature, many nations have progressed to possess the nuclear capability to destroy this planet. War has changed and so, likewise, must our perception of war if we are to survive. In the forty years between 1945 and 1985, there were no fewer than 120 major wars and 78,000,000 war deaths (Sivard, 1985). The world military budget in 1990 was \$880 million and the United States was first in the world in military spending. The F-117 Stealth fighter costs nearly 2000 times as much as a World War II fighter plane. In the ten years between 1978 and 1988 developing nations spent 23 percent more on military resources than they received in economic development aid. And during the 1980s, 74 percent of the people who died in war were unarmed civilians (Sivard, cited in Grier, 1991). An appropriate response to this problem would require a profound variation in our thinking. Can we envision a world where war is not inevitable? To believe in peace requires a global awareness.

More than one billion of us are chronically and persistently hungry (The Hunger Project, 1985, p. 7). Sometimes this is very difficult for children and adults in the developed nations to believe. They are more familiar with dieting for weight loss and with disease caused by over consumption, often of processed foods. What does it mean to learn that thirteen to eighteen million people die each year from hunger and starvation—35,000 people every day? (The Hunger Project, 1985). We have conducted the research and now have the knowledge, resources, and technology to end hunger. Are we willing to believe that, for the first time in history, we can live in a world without hunger?

To change the world's educational systems will also require shifts in thinking and a global aware-

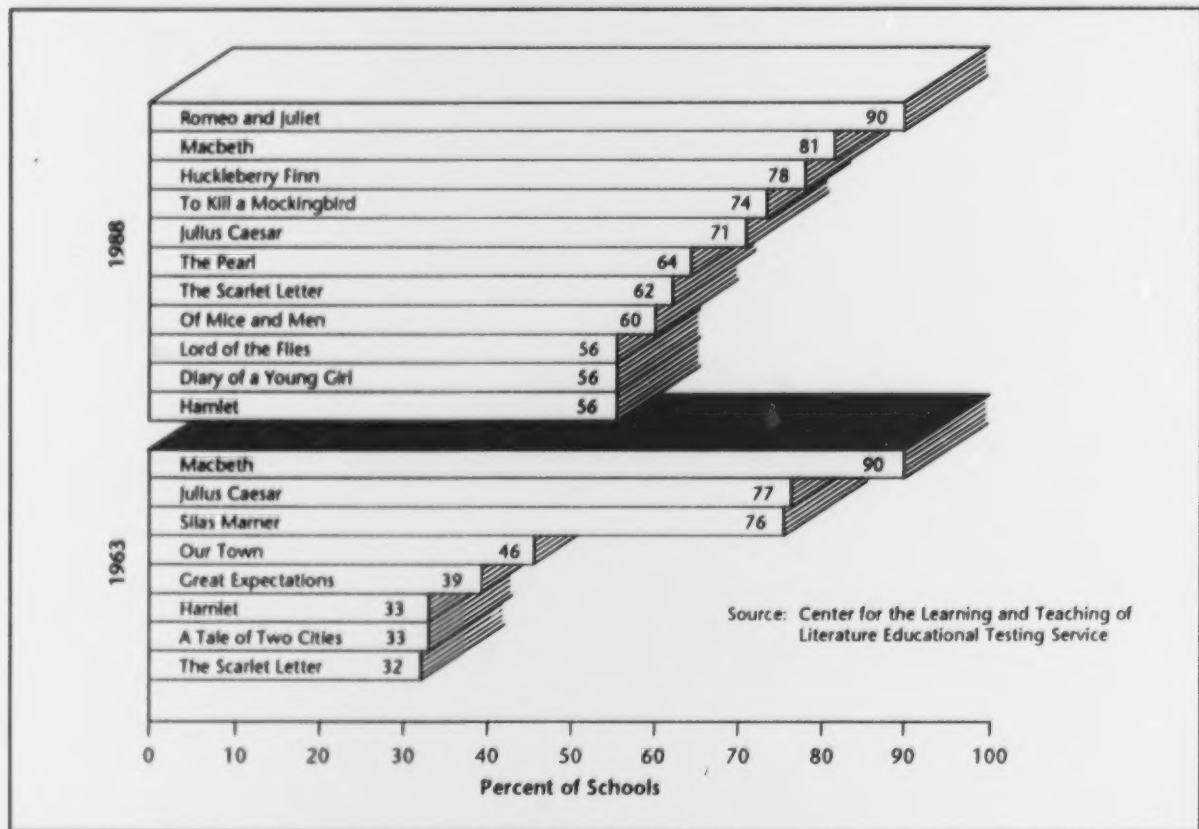


Figure 2 Books Most Widely Used in Public Schools — Grades 7-12

ness. Andrej Tchikirjeff is the principal of the Medical Philosophy Lyceum, a specialized High School in Moscow. Some of his recent comments are revealing:

"If for 20 years a person has been teaching the same subject, he will never change himself and his way of teaching," he said. "Throughout the world teachers, like the military, are very conservative. That's especially true here, where schools have been under totalitarian control."

Tchikirjeff said the history taught in Soviet schools "is not some lies, it's total lies." He said it was unrealistic to think that millions of teachers whose own level of education is fairly low are qualified to carry out reforms in education.

The only way to go forward, he said, is to invite people with no professional training as teachers to take up teaching posts and impart their knowledge and specialized skills to students.

"The most important thing is that these people should teach a freedom-loving character to students," he said. "If people are free, they will be thirsty for knowledge and education" (Moseley, 1991).

What is it going to take to reform American schools?

MULTICULTURAL EDUCATION or "Who was president during that war?"

Global educators would endorse drawing from a variety of cultures when devising curriculum materials. The literature assigned most in American schools has become quite routine over the past twenty-five years. The preferred authors are mainly white, American or English, and with a few exceptions, male. The chart above will probably strike a note of nostalgia in most persons reading it.

One wonders what the rationale could be for studying only the authors in the table above. Illuminating knowledge is generated throughout the world and is inherently worthy of study.

The following metacognitive lines of poetry written in 1976 by the Nobel prize winner, Octavio Paz, make one wonder what American students might be missing:

"Between what I see and what I say,
between what I say and what I keep silent,
between what I keep silent and what I dream,
between what I dream and what I forget: poetry."
(Paz, 1987, p. 485)

A Mexican, Paz has served as a foreign diplomat and immersed himself in European, Hindu, and Arabian cultures. Reading some of his works might be motivating not just to Mexican-American and other Hispanic students, but to students of all backgrounds. Multi-cultural education should never be seen as a nostrum for ailing cultural self-esteem. Multi-cultural education is not compensatory or inferior to "Western" education in any way.

History lessons in American schools are generally organized with reference to political leaders and military exploits. In a recent travelogue of India, V.S. Naipaul interviews a Hindu who presents the following thoughts:

'If you look at what Indian culture remembers—we preserve our books on mathematics, astronomy, grammar. We preserve Bhaskara and Charaka.' Seventh-century scientists. 'Among the things which are preserved are not the names of kings or their battles—that is not part of our tradition. We know Bhaskara and Shankaracharya.' Shankaracharya, a ninth-century philosopher who travelled all over India, revitalized Hindu philosophy, set up religious foundations (which still exist in certain places), and is thought to have died at the age of thirty-two. 'But if you ask, "Who ruled this part of the country in 1200?" people wouldn't know, and basically they wouldn't care.' (Naipaul, 1991, p. 158).

It would be possible to organize history lessons using new reference points. People and groups of people outside of the political/military mainstream are worthy of study. As Henry David Thoreau so

aptly commented: "Many are concerned about the monuments of the West and the East—to know who built them. For my part, I should like to know who in those days did not build them." (Thoreau, 1942, p. 82). People whose names are lost to history probably both did and did not build the monuments which are named for those whose names we remember.

Try as we may, even with intense research, we are not always going to be able to find the desired number of female or minority political and military leaders, nor the names of many female leaders in a variety of fields in any given culture. Of course, there is no substitute for research which regularly surprises us by yielding ghosts and rescuing them from invisibility. As we honor those whom we recall, we acknowledge the reasons for the want of representation and documentation among certain groups.

Global education can clarify students' thinking and explain why it is so hard to rescue minority and female names from obscurity. For example, the concepts of sexism and racism are pervasive, and are guides that lead students to understand history even as it continues to unfold. This is not to invite students to blame others for any group's lack of status, but rather to explain the causes of events. Any group interested in placing blame would have to blame itself to some extent; internalized racism and sexism are the most insidious and limiting forms of these thought systems.

Another of the many seminal topics associated with global education is colonialism. Colonialism can be used to explain traditional subject matter such as the American Revolution. Students will be able to understand the core reasons for the colonies' break with England and recognize patterns that can lead them to understand related phenomena such as the American Civil War, anti-American attitudes in the Middle East, and poverty in Africa.

The study of still another productive concept like development can teach patterns that not only explain why some nations are poor, but can provide some answers about what can be done about poverty. These fruitful concepts not only provide a framework for students to organize knowledge, but also promote metacognitive thinking. Students

move behind the scenes, so to speak, to analyze the thinking involved in historical and current events.

SYSTEMS THINKING or "We are the world"

Our lives are governed by a grand variety of global systems. Communication, transportation, money, credit, manufacturing, entertainment, and marketing are increasingly global in scope. The air we breathe and the water we drink are affected by the actions of all human beings throughout the world. The food we eat is part of an interdependent food chain. Military weapons are manufactured, sold, and marketed on a global basis. Disease spreads and cures are discovered irrespective of national boundaries. Musical concerts, dance troupes, and art exhibits crisscross the globe. Even the youngest students can understand the concept of a system. Their minds and bodies constitute one system. When information is learned as part of a global system, a great leap in comprehension occurs.

Systems thinking enlarges the scope of knowledge and assists students to integrate new learning into large constructs that make sense. For example, there is some controversy in this country about how the creation of earth should be dealt with in schools. This controversy is usually labeled "evolution vs. creationism." Evolution is a fundamental concept that explains the way that biological systems have been transformed. "Creationism" is actually a title for the Hebrew myth of creation. All known cultures have myths or stories to explain their origin. "Creationism" is only one of those myths. When students learn about the global scope of creation stories, it would not be logical to oppose just one of these stories. What about all the other creation stories? Even if the Hebrew account of creation is accepted on faith, it would still not be appropriate to require the teaching of this one account in a multicultural, multireligious society.

In classrooms all over the country, students spend a lot of time learning what crops are grown in what nations. Crops are grown as part of a global system of markets and transportation. For example, farmers in South America may convert their fields to grow drugs for Americans who consume more

than half of the world's licit and illicit drugs (Stirling, 1991). When these changes are understood as part of the global economy, they are much more interesting to students than are isolated lists of crops, some of which, like sorghum, are unfamiliar to them. Systems thinking promotes retention of information and engenders higher-level thinking processes.

Another alternative to simply learning lists of crops grown in various regions might be for students to analyze why the legumes that grow in the desert are no longer harvested or eaten. As Native Americans acquired preferences for hamburgers and other processed foods, they've developed problems with obesity and abnormal levels of diabetes (Brody, 1991). Crops could be studied as members of the various controversial constructs of "food groups." Or, human malnutrition and hunger could be related to crops as they are affected by the money system. Humans are hungry because they can't afford to buy food, not because adequate food is not produced. Systems thinking provides a context for knowledge and focuses on a fertile store of multiple thinking skills. These few examples are ripe for the exercise of such thinking skills as association, cause and effect, prioritizing, creative problem solving, and research inquiry.

THOUGHT INTO ACTION or "Let's go on a field trip"

The popular slogan "Think globally, act locally" encourages students to implement their global thinking through actions. Descriptions of the world need not overwhelm the student. As students' thinking shifts, they begin to recognize the similarities among humans and the pressing international imperative for cooperation. Students have the precious right to make choices, and are involved in many projects both nationally and internationally that benefit the human family. For example, students from many nations exchange art, scientific, agricultural, and many other types of projects. Students learn to cooperate with one another at their schools and work to restore the environment. Global service is a strong component of global education.

Global education encourages student travel, student and teacher exchanges, and foreign language study. The surest way to experience global thinking is to have the privilege of living for a long time among the people in another culture. This experience transfers to all cultures and leads to authentic global understanding and tolerance. Global awareness and compassion is probably the most important effect of the more than thirty years of the American Peace Corps experience.

Perhaps the most difficult choices are those to be made within one's own school. There are global choices to be made in every school. Some questions come to mind. Are school lunches nutritious? Is school waste recycled? How much school waste is there? How much time is wasted? Are all groups of students treated well? Do students know people outside of their own group? Are less advantaged students tracked according to "ability level" in order to learn lessons that all are capable of learning? Why are the knowledge and skills different in the various "ability" tracks? Is the work rigorous enough to prepare students adequately for adult life and work? Are vocational classes largely segregated by gender?

Global education as a field defined by educators has remained fairly stable for the past twenty-five years. Many curriculum materials have been produced, and these tend to conform to the same general patterns. Educators have kept global education in mind, however vaguely, and as change accelerates and world systems become increasingly global, the paradigm becomes more useful and viable.

Global education has the power to reorient students toward true hope for the future. Above all, a global education is about perspective. When the school world closes in, one recalls the student listening to "the learn'd astronomer" (Whitman, 1959, p. 196):

*When I heard the learn'd astronomer,
When the proofs, the figures, were ranged in
columns before me,
When I was shown the charts and diagrams, to
add, divide, and measure them,
When I sitting heard the astronomer where he lectured
with much applause in the lecture-room,
How soon unaccountable I became tired and sick,
Till rising and gliding out I wander'd off by myself,
In the moist night air, and from time to time,
Look'd up in perfect silence at the stars.*

REFERENCES

- Balk, A. (1990). *The myth of American eclipse*. New Brunswick, NJ: Transaction.
- Berry, T. (1990). *The dream of the earth*. San Francisco: Sierra Club Books.
- Brody, J. (1991, May 21). To preserve their health and heritage, Arizona Indians reclaim ancient foods. *The New York Times*, p. B5.
- Center for the Learning and Teaching of Literature, Educational Testing Service. (1989, November). Literature survey reveals few changes in school reading lists. *ASCD Update*, p. 3.
- Dearborn, M. (1991). *The happiest man alive, a biography of Henry Miller*. New York: Simon and Schuster.
- Grier, P. (1991, June 12). World arms spending still high: Developed nations buy 85 percent. *Christian Science Monitor*, p. 9.
- Hanvey, R. (1976). *An attainable global perspective*. Denver, CO: Center for Teaching International Relations.
- The Hunger Project. (1985). *Ending hunger, an idea whose time has come*. New York: Praeger.
- Kneip, W. (1985). *A critical review of the short history of global education: Preparing for new opportunities*. New York: The American Forum for Global Education.
- Moseley, R. (1991, September 8). Soviet teachers confront a crisis of credibility with their students. *Chicago Tribune*, p. 4.

- Naipaul, V. (1991). *A million mutinies now*. New York: Viking.
- Paz, O. (1987). Between what I see and what I say... *The collected poems of Octavio Paz, 1957-1987*. (E. Weinberger, Trans.). New York: New Directions.
- Sivard, R. (1985). *World military and social expenditures*. Washington, D.C.: World Priorities.
- Stirling, T. (1991, October). [Interview with M. Streicher of the DEA.] Unpublished raw data.
- Thoreau, H. (1942). *Walden*. New York: Walt J. Black.
- Tye, K. (1990). Conclusion: A look to the future. In K.A. Tye (Ed.), *Global education: From thought to action, The 1991 Yearbook of the Association for Supervision and Curriculum Development* (pp. 157-178). Alexandria, VA: ASCD.
- Whitman, W. (1959). When I heard the learn'd astronomer. In J.E. Miller, (Ed.), *Complete poetry and selected prose*. Boston: Houghton Mifflin.

LEARNING FOR LIFE

Dee Dickinson

Living is learning. From birth to death, every aspect of human development is dependent on how we learn. Never has this been so important as it is in the present period of rapid change and escalation of new information.

New parents, who in the past might have been supported and taught by members of an extended family in a close-knit community, must now often rely on their own resources. This is especially true in relation to the increasing number of very young mothers who are often uneducated and alone. It is clear that the learning and practice of effective parenting skills is not only essential for the parent and child, but for the entire community and the future of humanity.

The skills and abilities that children bring with them into school may well determine how successful their lives will be. The K-12 school years as well as post-secondary education are now more crucial than ever, since they must prepare students to change careers four or five times during their lifetime, careers that will demand very different kinds of skills from those required in the past. Employers are seeking not only those who are skilled in read-

ing and mathematics, but those who know how to learn and how to work cooperatively. The future of every culture depends on ethical, self-sufficient, cooperative, productive members of society who can apply what they have learned in many contexts.

The rapidly expanding number of retired persons also has major implications for the social, health and welfare, educational, and economical aspects of society. The Surgeon General recently reported the results of a study that indicated that physical health is influenced only ten percent by medical care, twenty percent by heredity, twenty percent by environment, and a whopping fifty percent by behavior. Much of that behavior is the result of learning—for better or worse.

It is apparent that education in its fullest sense is now the single most important factor in developing not only healthy individuals but a healthy world. No longer can students expect to complete their education at the end of high school or college or professional training. We have become a learning society, and if that society is to survive, learning must now become a priority for every individual throughout life. In order for this to become so,

there must be a greater variety of learning opportunities at every age to meet the needs of an increasingly diverse population in every country.

THE BEGINNINGS OF LEARNING

Learning begins before birth. According to Dr. Thomas Verny, author of *The Secret Life of the Unborn Child*, a baby is a sensing, feeling, remembering human being from six months after conception. A baby in the womb responds to touch by six weeks, shows a preference for sweet tastes and dislike for bitter tastes injected in the amniotic fluid by seventeen weeks, has a well-developed auditory system by five months, and has fully functioning central-nervous and sensory-motor systems before birth.

It is now well-documented, and has been discussed in numerous publications including Michael Dorris' *The Broken Cord*, that the fetus may be impaired as a result of the mother's smoking, drinking alcohol, or taking drugs. What a mother eats and drinks and how she feels emotionally all affect her unborn child. The fetus also responds to sounds in the environment and appears to be startled by loud noises, or comforted by gentle music and the mother's voice. All mothers must learn that these factors have an effect on their children's future.

Many existing institutions have a role to play in parent education. Maternity units of hospitals may fulfill an especially important function as they offer new mothers the kind of information they need in order to create a positive, stimulating, nurturing environment that can help their children to develop all of their capacities more fully. Community colleges and other educational organizations can create ongoing education and support.

The work of Drs. T. Berry Brazelton and Burton White has resulted in numbers of parent education programs that begin before the birth of their babies, continue in birthing centers or hospital maternity units, and are continued still further in community centers. Missouri is the first state to enact legislation to provide free parent-education and family-support services in every school district.

Seattle's Program for Early Parent Support is another example of a community effort to provide new parents with peer-support groups and continuing guidance and education for this most crucial role in any individual's life.

PROGRAMS FOR PARENTS AND CARE PROVIDERS

As increasing numbers of parents are working outside the home, the quality of day-care centers, preschool programs in public schools, and child-care in the workplace is of growing importance. Day-care providers must also learn how to create secure, stimulating environments that promote healthy development. Dr. Edward Zigler, Yale psychologist and director of the Bush Center in Child Development and Social Policy, stresses the crucial importance of ensuring that care givers are adequately trained, paid, and given appropriate recognition. He suggests that the long-term solution to the nation's child-care problem is to provide these services in all neighborhood schools.

Many community colleges are offering training for care providers and teachers involved in infant and early-childhood programs. The media can also be instrumental in educating both parents and day-care providers through informative, ongoing articles, public service announcements, and special programs.

As more and more children are involved in early childhood programs, it is important to keep in mind that "play is the work of childhood." The National Association for the Education of Young Children has much research to support the concept that "child-initiated and child-directed, parent or teacher-supported play is an essential component of developmentally appropriate practice." The parents and teachers who staff these programs must be well trained in knowing how to guide and support children in ways that are conducive to their physical, mental, emotional, and social development. These important first teachers must also model and foster the development of core values so lacking in our present society.

LEARNING IN EARLY CHILDHOOD

The NAEYC and many developmental psychologists, including those at Yale's Child Study Center and Tufts' Department of Child Study, point to the potentially damaging trend of pushing academically demanding work into earlier years. Some precocious children in an enriched environment will learn to read and do math on their own before they are old enough to go to school. Yet, since there is a wide variation in children's development, others may not be ready physically, cognitively, or emotionally to learn these skills until later.

If children have the opportunity to develop at their own pace in a supportive and stimulating environment in which their self-esteem is nurtured, it has been observed that most will be at grade level in the basic skills by the time they complete third grade. This finding reinforces the importance of multiple-age groupings in early elementary school.

THE SCHOOL YEARS

Throughout the school years it is essential that children have an opportunity to identify and learn through their strengths. There is no question that all children can learn successfully if they have an opportunity to learn at least part of the time in ways that are appropriate to their unique characteristics, and if the rest of the time they are given opportunities to explore and develop new abilities.

It is also essential that learning environments be positive and supportive, that learning processes be dynamic and interactive, and that students' mistakes be perceived as opportunities for them to learn. Child-centered, rather than subject-matter-centered, educational programs offer children ways in which to develop individually as well as socially in collaborative groupings.

Many traditional educational systems have focused on teaching knowledge and skills, attempting to cover an ever-expanding curriculum. With information doubling in most subjects every few years, and in science and technology in a matter of months, it is quite clear that emphasis must now be placed on learning how to learn and to manage new information.

Since it is impossible to continue adding more to the curriculum, it is essential to determine what in each subject is most important to be learned in terms of quality, utility, and effect on healthy human development. It is also essential to plan time for motivation before introducing what is to be learned; time to assure comprehension; time for practical and/or creative application; and methods of evaluation that not only indicate whether learning has occurred but also test higher-order thinking skills and the ability to apply the learning in other contexts.

The most recent study of the National Assessment of Education Progress reports once again that test scores are going up in the basic skills, but not in every area. Scores are going down in relation to comprehension, practical application, and problem solving. Many students are apparently unable either to comprehend or apply what they have memorized.

Given appropriate classroom procedures, effective strategies to think, learn, and problem solve, and a teacher who is a good mediator, every student will not only be able to learn but can also become more intelligent. The work of such educational pioneers as Dr. Reuven Feuerstein, Israeli psychologist, has proved conclusively that "intelligence is not a static structure but an open, dynamic system that can continue to develop throughout life."

In fact, Dr. Marian Diamond, Berkeley neurobiologist, points out that learning and experience change the brain anatomically. Her research shows that positive, nurturing, stimulating environments that encourage interaction and response actually promote the development of richer neural networks that are the hardware of intelligence.

SUCCESSFUL STRATEGIES FOR LEARNING

Students and teachers both experience greater success when the following teaching/learning strategies are standard equipment in the educational process. They include knowledge of:

- how to create a positive climate and build trust

- how to teach and maintain effective classroom procedures
- learning styles and multiple intelligences
- effective learning strategies and accelerated learning techniques
- thinking skills at all levels of Bloom's taxonomy
- mediated learning
- cooperative learning and collaborative teaching
- arts in education
- computers and interactive, multi-media technology
- interdisciplinary curriculum
- a variety of assessment devices
- an international and multicultural context

There are growing numbers of schools in which students and teachers are experiencing success in both rural and urban settings, including inner cities with all the accompanying challenges. Much of this success has to do with offering the students the tools of learning and the opportunity to learn through their strengths in a positive environment. Improvement does not happen overnight, and none of the previously mentioned strategies are quick fixes. Patience, determination, clearly communicated values, and a jointly shared vision facilitated by a dedicated educational leader are indispensable.

EXAMPLES OF SUCCESS

Imagine, for example, an elementary school designed in the shape of a four-leaf clover with clusters of classrooms at different grade levels in each "leaf," with banks of computers visible and accessible to classrooms in each grouping, and with a large library and resource room at the very center of the clover-leaf. The classrooms are separated by panels that can be slid open easily, allowing several classes to work together in multiple-age groupings. Imagine that in such a school all teachers join the staff knowing that they will be working col-

laboratively, and are dedicated to creating a positive environment for learning.

Each of the four sections, or "pods," is devoted to a theme of earth, air, fire, or water. The children and teachers change "pods" every eight weeks, and at that time there is an open house during which the children demonstrate their learning through drama and exhibits.

Because the teachers have spent over a year together planning this school and preparing themselves to staff it, they are well equipped with knowledge of the previously mentioned teaching/learning strategies. There is a strong focus on the arts, and technology is used not only to access information and master specific basic skills, but also to develop intelligence.

In the fourth grade, Pogrow's Higher Order Thinking Skills program (HOTS) engages small groups of children in Socratic thinking, in coordination with a stimulating and thought-provoking computer program. Every Thursday morning from 10:00 to 11:30, everyone in the building including the custodian, the learning assistants, librarian, and principal all teach during "project time," devoted to themes that develop higher-order thinking skills. With everyone teaching, it is possible to lower class student-teacher ratio to 18 to 1.

Imagine that the school is open every day from 6:00 a.m. to 6:00 p.m., providing day care for younger siblings and for teachers' children, and after school offering enrichment activities for children whose parents come for them after work. Because children with special needs are mainstreamed in the day-care program as well as in the school, all of these children have the opportunity to develop altruism, understanding, and compassion from an early age. The day-care program, which has physical and speech therapists as part of the staff, is offered at a modest fee to parents and is operated by an outside specialist contracted by the school district.

Because the school day begins ten minutes earlier and ends ten minutes later than usual, the requirements for teacher-pupil contact time are met even though school lets out at noon every Thursday. The faculty spends that afternoon planning, receiving inservice training, and sharing

lesson plans. The children can either go home or spend the afternoon in arts and crafts, foreign language, Tae Kwon Do, field trips, sports, or remedial or enrichment programs planned and coordinated by parents.

This rich academic environment encourages community involvement, with both volunteers and paid professionals offering an array of services from tutoring, to arts instruction, to sports programs, to presenting information about their own professional fields. A small fee is charged for some of these programs, with some of the income going to supplement the school budget. Murals, mobiles, and children's creative projects are everywhere. Inventiveness, creativity, collaboration, altruism, and sparkling enthusiasm are the hallmarks of this school, and the caring environment that has been created is evident.

The inventiveness of the staff is demonstrated, for instance, as the use of fairly inexpensive "surveillance" cameras (like those used in banks and supermarkets) instead of overhead projectors to project printed information or teachers' written directions. The cameras are also used to project student writing, plays, projects, or anything else for the whole class to see on a large video screen. Staff members have found that these cameras are simpler and sturdier than camcorders.

The school just described is not a daydream. It exists as the Silver Ridge Elementary School in Silverdale, Washington, a suburban community that has a long history of innovation in meeting the needs of its community and tapping its resources, including the nearby naval base.

In inner city Chicago, another school, The Guggenheim School, is enjoying remarkable success, considering that only three years ago student attendance was poor, teachers were taking all the sick leave they could get, few parents ever set foot in the school, and academic performance was poor. One day, principal Michael Alexander announced to his faculty that "We are no longer going to accept failure!"

A weekend workshop on accelerated learning techniques was met with disbelief that such "fun and games" could result in meaningful learning. But as teachers applied what they had learned with

great success, they asked to learn more. Ongoing staff training, eventually on the teachers' own time because of budget restrictions, has involved more instruction in other kinds of effective teaching/learning strategies, the arts, technology, and ways to develop higher-order thinking skills.

One twenty-year veteran member of the faculty says, "It's like a new day. I could go on for another twenty years." Attendance is now high for both students and teachers; every day parent volunteers assist classes in many ways; and academic achievement is rising steadily. In a wholly new professional role, the teachers have become well-known consultants, teaching to other teachers what they themselves have learned.

Innovative practices are also being implemented in many middle and high schools that are not only applying many of the previously mentioned methods, but are experimenting with flex-time in scheduling classes. Passive learning in small packages is no more effective for older students than it is for younger children. As hormones begin to rage, emotions become unstable, and students are trying to be comfortable in newly shaped and sized bodies, their cognitive development may suffer when teaching/learning methods are limited. They urgently need more opportunities for active, creative, individualized learning.

Dr. Herman Epstein, professor at Brandeis University, pointed out years ago that many adolescents experience a plateau in intellectual development, and this is not the time to offer them demanding, abstract academic challenges. Epstein's work was questioned at one time with respect to the methods he used for his research; however, few teachers who have worked with this age level would question the truth of his observations in the case of many adolescents. For them, active, dynamic, participative learning; opportunities to learn through both the arts and technology; and participating in service projects all offer opportunities for successful accomplishments.

Many schools are also implementing more flexible schedules, allowing for larger blocks of time in which to complete projects or explore subjects in greater depth. Team-teaching and an integrated, thematic curriculum have also become important

aspects of these schools. Examples are the Pine Lake Middle School in Issaquah, Washington, where there are no longer bells to jangle the nerves and terminate learning in mid-thought. As other examples, the fifty-four high schools that are part of Theodore Sizer's Coalition of Essential Schools report that integration of subjects in larger blocks of time facilitates more profound learning, greater mastery, and the forging of meaningful connections between subjects and ideas.

PREPARING FOR THE ADULT WORLD

It has now become abundantly clear that every student must have marketable skills before leaving high school. These skills can be learned not only in vocational education programs, but also in academic programs as students are offered opportunities for practical application of what they have learned. Additional preparation for adult life is offered through internships, service projects, and opportunities to "shadow" people in various professions and jobs.

The many student-operated businesses offer young people other stimulating ways to learn by operating school restaurants, newspapers, television and radio stations, child care centers, and horticultural programs. Through such programs, high school students who are not succeeding in traditional academic programs are given an alternative to "dropping out" by "stepping into" practical learning in different kinds of settings.

An example of this kind of learning experience exists in Georgia, where the Network of Small Business Development Centers has initiated a statewide and national program called REAL (Rural Education through Action Learning). The program offers local schools an opportunity to cooperate with community educators to teach students to research, plan, and operate small businesses.

At the present time, post-secondary education to prepare for employment takes place in a variety of settings including community colleges, universities, in the workplace itself, and even electronically. According to the Hudson Institute Report, *Workforce 2000*, two-thirds of the people who will be

working in the year 2000 are already employed today, and many of them are inadequately educated. In order to keep working, most will need some type of further training, since for the new jobs that will be created in the next few years more than half will require education beyond the high school level.

LEARNING IN THE ADULT YEARS

Studies of adult learning, such as that recently completed by Dr. Dorothy Billington (1988), reveal that adults not only learn more successfully when they have some sense of control over their academic program, but they also experience further personal development. It is important for human resource and development program planners to take this fact into consideration as they attempt to meet the growing need for more effective educational systems for adults.

This does not mean, however, going to such extremes as those pursued by some university graduate school professors, who, in an attempt to give adult students a sense of independence, are abandoning altogether the lecture-discussion method in favor of requiring students to discover knowledge on their own. Lectures can, in fact, be colorful, dynamic, multi-media ways to motivate students, communicate information to large groups, and present the lecturer's personal wisdom. But teaching and learning at any age must not be limited to these methods.

In these later years of learning, positive learning environments enriched with a variety of learning activities and methods have resulted in faster, more efficient, and more memorable learning. In one year, Bell Atlantic saved \$750,000 in training costs and cut training time in half by using accelerated learning techniques, including the visual arts, music, drama, games, and other activities in a relaxed and even playful environment.

Does intellectual rigor have any place in lifelong learning? It might appear that there is an anti-intellectual bias in the words that describe these programs: "student centered," "fun and games," and "active and dynamic." To the contrary, there is much evidence to support the opinion that rigor-

ous studying, thinking, and hard work are of the utmost importance in achieving excellence, but that they result from early learning in a positive, nurturing, and stimulating environment that is responsive to the individual's needs. It has been my experience that those students who fall in love with learning place rigorous demands on themselves far beyond the expectations of their teachers.

Benjamin Bloom's study of 120 gifted adults, reported in *Developing Talent in Young People*, reveals that almost without exception, these individuals' first experience with instruction in their field was with a warm, loving teacher who believed in their ability. Task-masters came later in the development of their careers. It is quite likely that the same may hold true in relation to any other kind of learning. Furthermore, at any age, the introduction to a new skill or a new subject to be learned may be best accomplished in an environment that is conducive to relaxed alertness. In such an environment it is safe to take risks and make mistakes, because they are perceived as opportunities to learn.

Daniel Yankelovich points out in his report, *Trends in Our Changing Society: What They Mean for Labor and Higher Education*, that adults today want more opportunities for self-expression and a wider range of choices; they want to participate in planning and decision-making; to find self-fulfillment; and have opportunities for personal development. Many value creativity and participation above higher salaries. Yankelovich sees a "huge rise in individualism in the workplace" and a "powerful surge in entrepreneurship." Ongoing learning to stay well-equipped with new information and skills is essential to support such aspirations.

Dr. Nell Eurich, author of *The Learning Industry: Education for Adult Workers*, says, "The economic clock is ticking. Nontraditional education for adults must expand.... Technology illiteracy in a majority of the work force could create a scientific ruling class. The challenge is to make up for the deficiencies and meet the developing demands of the workplace."

Eurich estimates that industries are spending around \$60 billion annually on the formal training of employees. That does not include the wages of

employees while they study, nor does it include on-the-job training programs. Motorola spends almost 2.6 percent of its payroll on employee training, and requires all divisions to spend at least 1.5 percent of payroll.

Most individuals will spend twelve to sixteen years in formal schooling, but they will spend roughly forty years in the workplace, which now clearly requires ongoing education to keep abreast of new developments. We have no choice but to become a learning society if we are to meet these needs.

Large corporations are based on effective research and development systems, unlike many school systems that do not analyze whether instructional programs are successful or not, and therefore often perpetuate inadequate programs and discontinue effective ones. These corporate systems are the source of information that indicates whether training is successful and cost-effective. This information is essential to know because it affects the bottom line—profit or loss. It seems that change takes place faster when success is measured in dollars rather than in human lives.

Corporate training programs today utilize a great variety of instructional practices including distance learning through satellite technology, tutored video instruction (often in cooperation with universities), video and computer conferencing, and most frequently a mixture of all of these. Without question, the use of technology is now an essential element in effective corporate training at all levels. Its greatest advantage is that it can teach large numbers of people simultaneously, while individualizing instruction and giving learners a personal sense of control.

LEARNING IN THE SENIOR YEARS

In relation to the rapidly growing population of senior citizens, Dr. Harry Moody, deputy director of the Brookdale Center on Aging at Hunter College, notes that "the challenge to education for an aging society will be a new emphasis on lifelong learning among late-life groups. In a post-industrial economy, human capital formation on a lifespan

basis now becomes strategically important. In fact, 'recycling' of human resources in the second half of life has already begun."

During the next generation, it is estimated that the proportion of people over age 65 will rise from the present eleven percent to twenty percent of the population. The collective wisdom and experience of this age group offers a resource the world has never previously had available. Before the 18th century only fifty percent of the population reached the age of 20 and only ten percent reached the age of 45. In 1900, life expectancy was 47 years. Today, seventy percent will reach the age of 60. Demographers estimate that sixty-six percent of all men and women who have reached age 65 in the history of the world are alive today.

It is during the senior years that, according to psychiatrist Abraham Maslow (1968), self-actualization takes place, if it is going to. Along with having many other significant characteristics, "self-actualizing people are, without a single exception, involved in a cause outside of themselves. They are devoted, working at something precious to them—a calling, a vocation.... They are working at something fate has called them to somehow, and which they love, so that the joy/work dichotomy in them disappears." The character of earlier learning experiences undoubtedly plays an important role in the development of self-actualization, but opportunities must also be created for seniors to utilize this capacity.

These are indeed the years in which to keep healthy, interested, and motivated—years in which to keep learning. Older people may learn more slowly, but they are often wiser, more resourceful, and more adept at problem solving. The emotional context of learning so important for younger learners is also crucially important for seniors. It appears that the warm, nurturing, stimulating environments that foster the healthy, happy development of children are also essential to keeping the mind, body, and emotions healthy in the elderly.

Existing institutions also offer this age group important resources. Literacy and other educational programs in community centers, Elder-

hostels in universities throughout the world, and computer networks offer endless resources. The American Association for Retired Persons Institute of Lifelong Learning publishes a list of Centers for Older Learners throughout the country.

Members of this age group most especially need to be needed, and offer an important resource for schools, day-care centers, and hospitals. In addition, the growing labor shortage will offer many senior citizens opportunities for part-time work and job-sharing as well as full-time positions.

It seems clear that the diversity of America's population in regard to age, cultural, social, and economic backgrounds, coupled with the rapid change that the whole world is experiencing, makes it essential to develop new collaborations of individuals and organizations and new ways of integrating information. It may be time to plan beyond the development of community learning centers to the creation of learning communities.

BECOMING A LEARNING WORLD

Never before has there been such a critical need for better ways to learn throughout life. Never has there been available so much solid research on learning and human development, and never has there been the technology available to process, evaluate, and communicate information so rapidly.

There is now the possibility—and also the urgency—of creating new educational and human development systems constructed from many of the components discussed in this chapter, and set in the context of the community learning centers that are springing up throughout the country.

Community learning centers piloted over thirty years ago in Flint, Michigan were open nearly around the clock and offered courses to students of all ages. Even though the "lighted schoolhouse" model has been somewhat slow to be replicated, community colleges have taken on this role by making education available to students of all ages, with all levels of qualifications, and at nearly all hours to accommodate any schedule. Today, however, learning centers housed in public schools are multiplying rapidly.

One example of an elementary school/learning center that attempts to meet the needs of its community is the Fidalgo School in Anacortes, Washington. This coastal town has fishing trade relationships with Japan, and as a result its adult population has growing interests in computer literacy and fluency in the Japanese language. Fidalgo teaches these skills to both children and adults, and their teachers earn credits toward a master's degree as they learn the skills they will be teaching.

Other skills that teachers have learned for this program include the ability to identify learning styles and help students to learn through their strengths; methods to enhance not only learning but also intelligence, cooperative learning strategies, planning an integrated, thematic curriculum; and organizing multiple-age groupings that include adult learners. The facility is open from early in the morning, when the day-care program begins, to evening for adult education programs.

The reasons for the present rapid development of such community learning centers may have to do with the needs of an increasingly diverse population with many different ways of learning that do not fit into traditional schools. According to Ronald Gross, editor-at-large of *Adult and Continuing Education Today*, "adults choose to learn when confronted by problems that require them to change. The challenges of living in a world of future shock will impel and shape our learning" (1988).

And that is just what is currently happening as society's needs for reducing drop-out rates, graduating better-educated individuals, producing better-equipped workers and more responsible, self-sufficient citizens coincide with new research emerging from the cognitive sciences, the development of more effective teaching/learning strategies, and the availability of new, easier to use technology that is rapidly decreasing in cost.

In addition to the escalation of community learning centers, there is also underway the creation of "learning communities" in suburban and rural areas such as Tacoma, Washington; Marshall, Minnesota; and Iuka, Mississippi.

Imagine a new community being built around a learning park at its geographical and psychological

center. The learning park, collaboratively planned and funded by education, civic, and corporate groups, would include technology centers, libraries, museums, theaters, auditoriums, gymnasiums, and other athletic facilities, set in a beautiful, natural environment. An effective research and development center would be at the heart of this community to provide systematic, ongoing evaluation of all of its educational systems and projects.

Around this center would be built day-care and preschool facilities, elementary and secondary schools, community colleges, and other adult education facilities with appropriate support services. These facilities would be collaborative, and services available to all of them would include educational counselors, social service, health and welfare agencies, wellness centers, and clinics.

Small businesses would be included in the next circle. These might include secretarial and printing, horticultural and landscaping, food preparation, mechanical and technological repair services, and day-care facilities for children and seniors. In these facilities, students at various levels of education could experience "learning by doing" in real jobs that might pay small stipends and return profits to the school system.

Housing would be in the next circle out, conveniently situated between the learning center and outlying shopping centers, hospitals, and workplaces, including office buildings, manufacturing plants, and technical services. The entire community would be linked electronically to make it possible for every home, school, and business to access databanks and other resources in the community, in other states, and in other countries of the world.

Such an electronic system is already being developed in Cerritos, California, a master-planned, residential community that is now in the second year of a communications experiment that could revolutionize learning in every setting. The community is testing the use of fiber optics that has almost unlimited capacity for carrying voice, data, and video signals simultaneously and with astounding speed—over a billion bits of information per second. With such technology, it may one day be possible for every home, business, and school to

have instant on-line access to all the books ever written, all music ever recorded, all films ever made from anywhere in the world.

At the present time, tests under way in Cerritos include FiberTone, a local telephone service over GTE's fiber-optic network; point-to-point switched video, which provides not only two-way video telephone service, but makes it possible to use camcorders and television screens to send and receive full-motion video and audio signals; video on demand, which offers a library of videos, available around the clock (with VCR-like functions such as pause, forward, and reverse); GTE Main Street, which offers access to shopping, financial, travel, education, civic, information (including data bases), and entertainment services. The implications for education are endless.

Interactive, multi-media technologies accelerate learning and make possible the exploration and extension of human intelligence. Technology can facilitate communication with other minds and the "cross-fertilization" of ideas, the networking of organizations, and the collaboration of international educational systems. And technology will make possible the development of global data banks and research and development systems to facilitate the assessment of educational strategies and programs, and to offer training in and dissemination of the most effective of these worldwide. In the near future there may come into being a global learning community, in which the people of every country will have the opportunity to learn for life.

REFERENCES:

- Billington, D. (1988). Ego development and adult education: The effects of intellectual stimulation, motivation, gender, time, and traditional versus self-directed learning programs. *Dissertation Abstracts International*, 49. (University microfilms No. 88-16, 275)
- Bloom, B. (1986). *Developing talent in young people*. New York: Ballantine.
- Bredikamp, S. (1986). *Developing appropriate practice in early childhood programs serving children from birth through age 8*. Washington, D.C.: National Association for the Education of Young Children.
- Costa, A., & Lowery, L. (1989). *Techniques for teaching thinking*. Pacific Grove, CA: Midwest Publications.
- Decker, L. (1990). *Community education: Building learning communities*. Alexandria, VA: National Community Education Association.
- Diamond, M. (1988). *Enriching heredity*. New York: Macmillan.
- Dickinson, D. (1991). *Creating the future: Perspectives on educational change*. London: Accelerated Learning Systems.
- Dorris, M. (1990). *The broken cord*. San Francisco: Harper and Row.
- Dychtwald, K. (1990). *The age wave*. New York: Bantam Books.
- Epstein, H. (1986). Stages in human brain development. *Developmental Brain Research*, 30, 114-119.
- Eurich, N. (1990). *The learning industry*. Princeton, NJ: Princeton University Press.
- Eurich, N. (1985). *Corporate classrooms: The learning business*. Princeton, NJ: Princeton University Press.
- Feuerstein, R. (1984). *Instrumental enrichment: An intervention program for cognitive modifiability*. Baltimore, MD: University Park Press.
- Feuerstein, R., Rand, J., & Hoffman, M. (1979). *The dynamic assessment of retarded performers: The learning potential assessment device*. Baltimore, MD: University Park Press.
- Gardner, H. (1984). *Frames of mind*. New York: Basic Books.
- Gardner, H. (1985). *The mind's new science*. New York: Basic Books.

- Gross, R. (1988). *Education Summit on Lifespan Learning. Conference of New Horizons for Learning*, George Mason Univ., Fairfax, VA.
- Guild, P. (1986). *Marching to different drummers*. Alexandria, VA: ASCD.
- Johnson, D. & Johnson, R. (1984). *Circles of learning*. Alexandria, VA: ASCD.
- Johnston, W. (1987). *Workforce 2000: Work and workers for the 21st century*. Indianapolis, IN: Hudson Institute.
- Kitchen, K., & Kitchen, W. (1988). *Two way interactive television for distance learning: A primer*. Reston, VA: National School Boards Association, ITTE.
- Knowles, M. (1984). *The adult learner: A neglected species*. Houston: Gulf.
- Knowles, M. (1989). *The making of an adult educator*. San Francisco: Jossey Bass.
- Maslow, A. (1969). *Toward a psychology of being*. New York: Van Nostrand Reinhold.
- Moody, H. (1988). *The abundance of life*. New York: Columbia University Press.
- National Association of Secondary School Principals. (1982). *Student learning styles and brain behavior*. Reston, VA: Author.
- National Association of Secondary School Principals. (1989). *Organizing for learning: Toward the 21st century*. Reston, VA: Author.
- Ornstein, R., & Thompson, R. (1990). *New world new mind*. New York: Simon and Schuster.
- Ornstein, R., & Thompson, R. (1984). *The amazing brain*. Boston: Houghton-Mifflin.
- Perkins, D., Nickerson, R., & Smith, E. (1985). *Teaching thinking*. Hillsdale, NJ: Erlbaum.
- Poster, C., & Kruger, A. (1990). *Community education in the western world*. New York: Routledge, Chapman and Hall.
- Rose, C. (1986). *Accelerated learning*. New York: Dell.
- Sternberg, R. (1988). *The triarchic mind: A new theory of intelligence*. New York: Viking Press.
- Sternberg, R. (1990). *Wisdom, its nature, origins and development*. New York: Cambridge University Press.
- Verny, T. with Kelly, J. (1981). *The secret life of the unborn child*. New York: Dell.
- Yankelovich, D. (1985). Trends in our changing society: What they mean for labor and higher education. *Proceedings of the National Meeting of the Labor/Higher Education Council*, Washington, D.C.

RESTRUCTURING EDUCATIONAL REFORM FOR STUDENTS AT RISK

Beau Fly Jones and Jean Pierce

Each year, literally hundreds of thousands of the nation's youth are classified as special education students or as low achievers and assigned to special classes theoretically designed to meet their particular needs. In 1985, the funding for these special programs was \$1.64 billion (Gartner & Lipsky, 1987); in 1990-91, the Chapter 1 budget will provide \$5.2 billion. Yet recent research suggests that widespread policies and practices, while well-intended, may in fact function to sentence these students at risk to a poor quality education and the consequences that derive from it (Slavin, 1987). Worse still, recent research argues that these policies and practices may actually create many of the problems they are intended to alleviate. Indeed, the central argument of this paper is that low achieving students have unequal access to quality education, which is at least parallel to the differential access to educational opportunity at issue in *Brown vs. the Board of Education* in 1954.

Never in American history has the education of the disadvantaged been more crucial to the very fabric of society. The United States is tottering on the edge of competitiveness among many nations that challenge our political and economic leader-

ship in the world. Our inability to educate the nation's poor is a threat not only to our democracy but also to our future prosperity.

Yet this problem is not without hope. There are signs of a rising tide of public opinion among leading researchers and educators to identify unequal access to quality instruction as a top priority; to focus on fundamental causes, not just symptoms and cosmetic solutions; and to offer some hard choices for a new wave of educational reform (e.g., Goodlad & Oakes, 1988). There is also the promise of well-documented instructional strategies based on sound theories, which can effectively address these problems. We must use this knowledge to find new ways to offer equal access to quality instruction.

The purpose of this paper is to discuss the realities, myths, and possible costs of current policies and practices as well as the potential impact of the new thought on instruction and school reform. It is hoped that this paper will be the basis for social and political action. Parents, teachers, administrators, and even many policy makers seem to be mostly unaware of the powerful forces that have essentially institutionalized inequity and under-achievement, and unaware of the consequences to citizens of all

ages and walks of life. Yet, fundamental change cannot take place without large-scale politicization of the general public. If ever there was a time to redirect the thrust of the reform movement to constructive action, it is now.

The remainder of this paper will discuss the following issues:

- Why is the education of students at risk so important?
- What are current policies and practices?
- Why are these policies and practices a problem?
- Are there any solutions?
- What are the implications for policy?

WHY IS THE EDUCATION OF STUDENTS AT RISK SO IMPORTANT?

We must begin with this question, because, unfortunately, the average citizen does not seem to realize what is at stake, perhaps because he or she has no children in school or else has them nestled in safe places, where it is assumed that they will learn to read, write, and think critically. Nevertheless, there is growing concern about four critical issues that will affect everyone in this country: (1) demographics, (2) the growth of a very costly "underclass," (3) conflict in higher education, and (4) economic competition with other nations.

Demographics

Very recently, a newscaster was discussing the upcoming elections and said that the majority of people in this country are not young, poor, or minorities. We are for the first time ever in United States history approaching a balance between teenagers and senior citizens (Hodgkinson, 1985). In 1983, we had, for the first time, more people over 65 than teenagers, and this trend will continue through our lifetimes. This means that there will be an ever decreasing pool of workers to pay for increasing retirement benefits. We have already moved from 17 workers paying for social security for each retiree to 3.4 workers per retiree. Moreover, if the available workers cannot compete and produce effectively in the economic sector, busi-

ness and industry will suffer as much as the social security system.

The surge of immigration from Asian and Hispanic cultures complicates the issue. According to Hodgkinson (1988), shortly after the year 2000, one out of three persons living in the U.S. will be a nonwhite. In fact, 83 percent of the 20 million new workers between now and the year 2000 will be drawn from the overlapping categories of women, minorities, and immigrants. Hodgkinson predicts that the three challenges for the public schools arising from these facts will be to deal with poverty and its attendant problems, with non-English speaking populations, and with the number of physically and emotionally handicapped. These facts have enormous implications for education and for the survival of democracy, as well as the very social structure of our society.

The Growth of An Underclass

While the populations that need the most help are increasing, the urban schools that serve these populations are in a crisis that is both widespread and historically significant. The very titles of recent reports are suggestive: *An Imperiled Generation: Saving Urban Schools* (Carnegie Report, 1988) and *Visions of a Better Way: A Black Appraisal of Public Schools* (Committee on Policy for Racial Justice, 1989). According to these and other reports (e.g., Levine, 1985), urban schools are stultified by the crossfire of court rulings, teacher strikes that demoralize students and school staff alike, and public outrage. Urban schools are continually weighted down with principals and teachers who are disproportionately in the bottom ranges of scholastic ability and productivity. While urban reforms are in the making, the chaos of poor planning, outdated methods of training and communication, and top-heavy bureaucracies mindlessly sap the energies and resources of urban schools. Program achievements of one administration are regularly dismantled by the next in predictable cycles. As one administrator said on *Chicago Schools: America's Future*, "The problem with the school system is the school system." (Aronson, 1988). What is historically significant about this crisis is the enormity of the financial and human costs.

The primary casualties, of course, are the students. On the inside, they are the school vandals and troublemakers, the failures and low achievers, the substance abusers and pushers, the teenage parents, the absentees, and truants. On the outside, they are the drop outs, the illiterate graduates, the unskilled, and the criminals. What is perhaps most serious, besides the loss of individual talent and energy, is the rapid growth of an uneducated, unproductive "underclass," which is increasingly destructive to its own members and to society at large (Cuban, 1987; Lamar, 1988).

The schism between the able and socially mobile, on the one hand, and the disabled and socially immobilized, on the other, belies our commitment to the American Dream and tolls the possible failure of this country to fill the diversity of jobs needed for economic growth and competition in the world market. It is entirely possible that we may not be able to produce enough skilled adults to support the Army, to conduct needed medical research, to run complex technological systems, or to sustain many of the basic functions of a vigorous and flourishing economy (The Report of the Commission on the Skills of the American Workforce, 1990). The longer we fail to educate these troubled masses—and they can be educated—the greater the cost to our schools, cities, and ultimately our society.

Indeed, Levin (1987) warns us that at the same time that the disadvantaged will suffer high unemployment rates, and fill low or menial occupations, their political power will increase, because they are multiplying so much faster than other groups. "The specter of a dual society suggests great political conflict and potential upheaval. Economic and educational inequality in conjunction with equal political rights are the ingredients for future polarization and intense political, social, and economic conflict and instability." (Levin, 1986, p. 3; see also 1987). He and others such as Porter call for a fundamental reordering of the relationship among society, the classroom, and the students (Porter, 1985).

Conflict in Higher Education

The implications of the crisis in urban schools and the growth of an underclass have far-reaching im-

plications for higher education, according to Levin (1986; 1987). As the numbers of educationally disadvantaged increase, public institutions of higher education will become more restrictive or must develop a greater focus on remedial work. Either alternative is fraught with problems. As Levin sees it, the increase in remedial functions may lead to an overall weakening of requirements and standards for graduation. Such an outcome would increase the gap, and probably the conflict, between public and private institutions. The other alternative, restricting admissions, would widen the gap between the educated and uneducated at a time when the numbers of uneducated are increasing their political power. Thus, either alternative might yield political and social turmoil on and off campus.

Survival of Democracy and Economic Strength

The current concerns of business and industry as well as politicians about America's ability to maintain world leadership focus heavily on our inability to train the nation's youth, especially our inability to educate minorities and the poor for the diversity of new jobs that require thinking and skilled performance. More and more, businesses are expanding their job training programs and taking a more forceful role in educational policies, because schools are not providing students who can anticipate and solve problems, read critically, or process information effectively. These leaders wonder why our schools are so much less effective than those in Japan, China, and other countries, where the productivity and social conscience of the citizenry are increasing, rather than decreasing (Tucker, 1988). That these concerns are widespread can be seen in the recent spate of articles in *Fortune*, *Newsweek*, *Business Week*, and *Money*. We cannot continue to ignore them with lip service to structural change.

In the final analysis, the mis-education of the nation's poor is in conflict with this country's basic values of excellence, equity, and productivity. We may not only be wasting billions of dollars spent to provide inappropriate and ineffective education, but also incurring the cost of the social and economic damage done through our continued failure to effect fundamental change.

WHAT ARE CURRENT POLICIES AND PRACTICES?

Federal policies now classify most mentally impaired students into legal and financial categories such as Learning Disabled, Educable Mentally Retarded, and Trainable Mentally Impaired under the aegis of special education. This is called categorical funding, because each category has corresponding state and local "territories" of funding for specially trained teachers and teacher trainers, special programs and tests, targeted schools, and administrators to regulate the flow of funds from the federal government to the school system and to publishers. The rationale for categorical funding is that each type of problem has unique and identifiable features and therefore requires a different type of treatment. In 1985-86, eleven percent of the total public school enrollment were classified as special education students (Gartner & Lipsky, 1987).

Typically, however, special education categories do not identify all students at risk. In any given school system, there is always a large population, especially concentrated in urban areas, of students without diagnosed handicaps, who nevertheless fail in school year after year. These students are labeled unofficially with such terms as slow learners, poor readers, under-achievers, illiterate, and below level. They, too, may be assigned to special programs using Chapter 1 funds. Indeed, Ortiz (cited in Weiner, 1991) argues that "special education has to stop being the answer for all children who are having academic problems" (pp. 3-4). Ortiz estimates that two-thirds of students with limited proficiency in English in Texas are misclassified as needing special education.

What is the nature of prescribed instruction for using Chapter 1 funds? Before answering this question, it is necessary to make a sharp distinction between old and new Chapter 1 legislation. Old Chapter 1 legislation, valid until July 1, 1988, contained two important concepts that, while well-intended, had profoundly negative effects on student outcomes. First, a major criterion for programs receiving federal funding was that they were not to repeat or duplicate instruction in regular classrooms—a rule stipulated to prevent

remediation efforts from repeating the same instruction which did not work the first time. Second, instruction in such programs has been based on very widespread and deep-seated beliefs about intelligence and instruction. Specifically, it has been assumed (1) that students must master basic skills before they can master higher order skills; (2) that there are important limits to what can be done because IQ is basically stable (relatively unchanging throughout the years); (3) that the instruction of problem students should not "hold back" the rest of the class, and (4) that separate programs are the best way to meet the criteria for funding compensatory education and classroom management problems arising from heterogeneous classrooms.

Although more recent legislation allows block grants to schools, most programs for students at risk are still pull-out programs using supplementary materials or vocational programs that separate low-achieving students from others. Generally, pull-out programs are focused entirely on basic skills such as decoding and literal comprehension in reading, grammar and mechanics in writing, and mastering basic numerical facts in mathematics (Allington et al., in press). For older students, a typical program focuses on remedial reading and math and vocational education curricula that teach basic skills and factual information, according to Resnick & Resnick, 1985.

By law, the required procedure for prescribing and sequencing instruction for special education students is based on what is called an IEP (individualized education plan). This plan was established to ensure that students could be given instruction appropriate to their individual problems, and thereby proceed at their own pace. A parallel principle in regular classrooms is called Continuous Progress, a critical promotion policy that essentially abolishes grade-level expectations. According to this policy, all students progress at their own rates through various levels of a matrix of skills and other objectives. Theoretically, the policy removed the stigma of failure for low achieving students, while allowing high achieving students to progress at a different rate; if there are no grade levels, there could be no failures or social promotions and bright students would not be held back.

Each of these policies and practices may have been based on valid reasoning, given the available evidence and popular thought emphasizing the stability and static nature of mental abilities (e.g., Bloom, 1976; Jensen, 1969). However, the implementation of these policies has all too often yielded highly dysfunctional consequences—often the opposite of what was desired. Equally importantly, the legitimacy of the underlying assumptions is being challenged throughout the country by numerous scholars and concerned educators.

Under the new Chapter 1 legislation, there is a greater emphasis on integrating students at risk with regular students; indeed schools can now use Chapter 1 funding to supply additional teachers and aides in the classroom to create programs emphasizing higher-order thinking, and to implement school-wide projects (*Education Daily*, 1988). However, these new laws are not widely understood, especially not the focus on higher order thinking. And although many states have required schools with high proportions of low-achieving students to develop school improvement plans (Council of Chief State School Officers, 1987), examination of these plans suggests that they do not necessarily focus on curriculum reform and instruction based on research or programs demonstrated to be effective for low-achieving students. It is also important to note that there has been an evident change in the administration of Chapter 1 at all levels of government (Fagan & Heid, 1991). It is hoped that new administration procedures will focus more on research-based curriculum, instruction and assessment as well as communicate the new ideas to schools.

WHY ARE THESE POLICIES AND PRACTICES A PROBLEM?

While programs for students at risk are fraught with problems, the following stand out: categorical labeling, outdated conceptions of intelligence and assessment, inappropriate instruction, negative effects of the first wave of reform, and poor management of instruction.

Categorical Labeling

There are four problems with categorical labeling. First, the standards for assessment are patently unreliable. Shepard, Smith and Vojir (1983), for example, summarized national data examining the appropriateness of the labels for various categories; they found that at least half of the learning disabled population could more accurately be described in other ways such as slow learners, as children with second-language backgrounds, as children who are naughty in class, as those who were absent more often, or as average learners in above-average school systems. And these are not isolated findings. In fact, some scholars have argued that the misclassification of students in various categories is a major barrier to delivering appropriate instruction (Gartner & Lipsky, 1987). This topic is discussed further below.

Second, the process of labeling may be based more on political and financial expediency rather than instructional and humanitarian considerations. For example, Jenkins and his colleagues note "that between 1976 and 1983 the number of children identified as learning disabled increased from 800,000 to 1.8 million while the number of children served by Chapter 1 decreased by 1.5 million, despite the fact that there are more children below poverty levels now than ever before... The inescapable conclusion is that children are being made to fit labels in order to receive entitled services." (Jenkins et al., 1990).

Third, an equally serious issue to consider is the extent to which instruction changed or did not change in order to fit the labels. Moreover, there is ample evidence discussed below that categorical labeling, even if it were accurate, not only fragments curriculum and instruction, but also results in inferior instruction.

Finally, there is the charge that once students are labeled, they are imprisoned in these special classes for the rest of their life at school.

There is dramatic evidence to support this claim; over ninety percent of mildly handicapped students were never assigned to regular classes, according to Gartner and Lipsky (1987). The same authors also quote a letter from the Deputy Director of the Office of Special Education Programs,

for the U.S. Department of Education, dated 1986. The letter is a five-line response to a request for data concerning children who are certified as handicapped and have returned to the regular classroom. It states that the data requested would be "interesting," but they are not required by the current law; nor has the Office of Special Education Programs ever collected such data. The authors conclude that the reasons for not collecting the data has to do with beliefs and attitudes about the purposes of special education and the nature of the limitations of special education students.

Outdated Conceptions of Intelligence and Assessment

A major reason why the measures for the various categories of special education are not reliable is that they are based on outmoded concepts of intelligence. We know now that IQ tests and many other standardized tests are not good measures of the mental operations necessary for achievement in the real world, or the individual's capacity to learn and apply what is learned to solve real problems (Gardner, 1987; Resnick, 1987). Thus, according to Sternberg (1985), we must think about intelligence "beyond IQ." We also know that the mental abilities measured by intelligence and other tests are definitely modifiable at all school ages, given appropriate instruction (Bloom, 1984; Hunt, 1972; Sharron, 1987; Weinstein, Goetz & Alexander, 1988), and there is strong evidence that the appropriate instruction should be rich in opportunities for learning, focus on higher order skills, and teaching for understanding (Bransford, Sherwood, Vye, & Rieser, 1986; Allington, 1991; Jones & Idol, 1991; Jones, 1988).

Moreover, there are many problems in constructing measures of intelligence and achievement: cultural bias, improper calibration and norming populations, poor test format and validation procedures, too much opportunity for randomly guessing correct answers, the assumption that there is always one right answer, the lack of focus on higher order thinking, and the focus on assessing past achievement (Linn, 1991). Hence,

the labels applied to tested students may be invalid in large numbers of instances due to test errors.

An underlying cause of these problems is that, with few exceptions, there is no established theory for a fine-tuned understanding of mental impairments, apart from inadequate existing conceptions of general intelligence. There is much debate among specialists about the definitions and the causes. Therefore, most specialized tests may be developed from invalid assumptions, and many of them are validated against the existing intelligence tests or each other!

Finally, one must question the destructive assumptions underlying norm-referenced tests in relation to evaluating individual performance and the policies at the local level which are based on the tests. Percentiles and bell-curve norming inherently and inevitably define half of all those who take such tests as failures, without reference to instruction or the quality of items being tested. Moreover, this indictment may function as a long-term conviction for those labeled, if they are then removed to programs which deprive them of the very instruction they need to improve. Needless to say, if this system of assessment and classification is not valid, the instruction for the various categories is not valid either.

Inappropriate Instruction

There is increasing consensus throughout various academic disciplines that the focus on isolated basic skills instruction is inappropriate for regular students as well as for low-achieving students (Anderson, Hiebert, Scott, & Wilkinson, 1985; Jenkins et al., 1990). This is to be distinguished sharply from basic skills instruction in the context of learning specific content, solving problems, and dealing with real life situations.

The diversity and intensity of the concerns against isolated basic skills instruction cannot be fully addressed here, but four issues require mention:

- Isolated basic skills instruction is decontextualized, and fails to teach students to use and apply what they learn in appropriate academic and real-world contexts (Anderson, Hiebert, Scott & Wilkinson, 1985; Sticht, in press).

- Students may pass the tests and still not read fluently or solve problems effectively; nor is there any evidence that basic skills instruction enhances retention (*Educational Leadership*, 1990; Pink & Liebert, 1986).
- Higher order skills such as representation, summarizing, organization, and elaboration are needed to understand basic facts in reading, math and science (Bransford, Sherwood, Vye & Rieser, 1986; Marzano, et al, 1988).
- What is important in today's world of complex and changing information is to teach students to learn how to learn; to define, anticipate, and solve problems; to shape and manage change; to develop strategies for understanding complex systems; to deal with conflicting information and multiple sources; and to become technically literate (Banathy, 1988; Kane, Berryman, Goslin, & Meltzer, 1990).

All of this is not to say that low-achieving students do not need to learn to read, compute math problems, or learn skills. What is at issue here is how they learn those skills and how much attention they receive relative to reading real books and solving problems. (See below for description of appropriate instruction.)

Additionally, recent research suggests that the instruction designed for students at risk may be crippling and demeaning, rather than enabling and empowering. Although some pullout programs are successful in improving basic skills (Madden & Slavin, 1987), students in pullout programs or lower-level tracks within schools or classrooms may be stigmatized and assigned to instruction that is qualitatively inferior to instruction in regular classrooms. These programs often function to provide less, rather than more, learning time; they focus on isolated skills and endlessly boring repetition, rather than meaning and reasoning; they may be inconsistent with the regular instruction, thus causing confusion and perhaps learning problems; they involve passive and isolated learning, rather than interactive and social patterns of thinking; and, in the final analysis, they may preclude or prevent disadvantaged youth from participating in the very types of instruction that

they need the most (Allington, 1991; Brown, Palincsar & Purcell, 1986; Gartner & Lipsky, 1987; Resnick & Resnick, 1985). Thus, many students may spend all their time in "independent" drill and practice without being allowed to read real books or solve problems. In fact, Allington argues that this instruction is designed in ways that are unlikely ever to facilitate either learning to read or learning to think critically.

Anyon (1980) argues that there is a spurious relationship between the social class of the students and the hidden curriculum of classroom experiences and the nature of school work. Specifically, five elementary schools were studied in depth for analysis of school tasks and social interactions. The data support the thesis that "the knowledge and skills leading to social power and reward...are made available to the advantaged social groups but are withheld from the working classes, to whom a more 'practical' curriculum is offered (e.g., manual skills and clerical knowledge)" (Anyon, 1980, p 67; see also Resnick & Resnick, 1985).

Much has been said about the cognitive effects of the education available to students at risk. The affective results are serious. Gougis (1986) explains that racial minorities are caught in a vicious cycle, in which stress leads to low academic achievement, which leads to low occupational achievement and income, which leads to a poor quality of life, which leads to stress. In contrast, the relatively less stressful lives of white students more often lead to high academic achievement, which leads to high occupational status, which leads to higher income and a better quality of life, which leads to less stress. Analytical as well as experimental data were presented to support this model, which can be seen in Figure 1.

Many of these problems exist for low-achieving students in the regular classroom. For instance, it is well-documented that when low-achieving students are in the regular classroom, teachers are far more inclined to assign drill and practice and to ask the low-achieving students to sound out words. In contrast, teachers tend to teach meaning and higher-order thinking with the more proficient students. And these practices are not new. Rist, for example, forecast these and other patterns in a

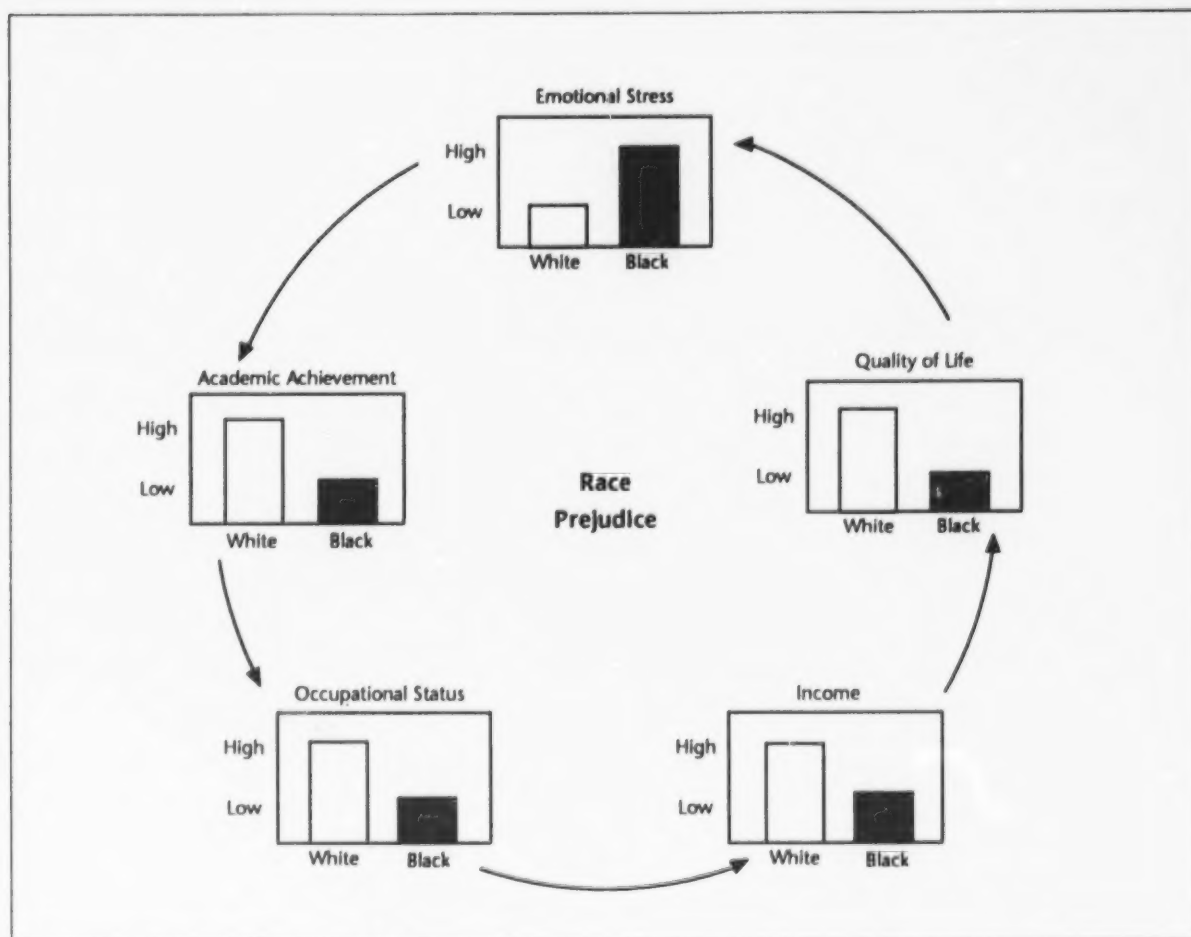


Figure 1 Theoretical Illustration of the Relationship Between Emotional Stress, Academic Achievement, Occupational Status, and Income: by Race

1973 study poignantly titled "The Urban School: A Factory for Failure."

There is also compelling evidence that the passivity and resistance that so often characterize students at risk, are not unreasonable responses to the often humiliating learning situations, which cause them so much pain and do not address their needs, according to Brown, Palincsar, & Purcell (1986). These researchers claim that low-achieving students have in effect been taught to behave according to a stereotype; that is, they have learned their helplessness from the context of the instruction they are given.

NEGATIVE EFFECTS OF THE REFORM MOVEMENT

While the reform movement initiated by *A Nation At Risk* (National Commission on Excellence in Education, 1983), galvanized the country to focus on educational problems, the effects have not all been beneficial. As an illustration, initiatives for academic "rigor" have actually harmed, rather than helped, students at risk, according to many educators (Levin, 1987). That is, the increased difficulty of the new generation of entrance and exit requirements and the new instructional materials

have actually increased the numbers of failures (Jones, 1986). This is true for students and for student teachers. Resnick and Resnick (1985) argue that these are *strategies of selection*. What is needed is a parallel emphasis on *strategies of instruction*. Many of the best changes in the basals that would have benefited students at risk, such as a greater emphasis on reading unadulterated stories, are unlikely to do so as long as such students are scheduled for basic skills courses and specially prepared, "watered down" basal materials.

Another strategy of selection may be found in the recent spate of thinking skills programs fashioned largely to develop the mental skills measured in IQ tests and "higher-order skills" that are frequently inappropriate for the very populations they were intended to serve. The ironic and tragic result is that these programs are often offered to those who need them the least (the gifted) and function to widen, rather than decrease, the gap between those who have effective mental functioning and those who have not (Feuerstein, et al., 1991). Sadly, this is true even of the *Instrumental Enrichment* program which Feuerstein and his colleagues designed for retarded students (Feuerstein, Jensen, Hoffman & Rand, 1985). Many schools assign this program exclusively to gifted students, because they assume that low-achieving students cannot engage in such skills as summarizing and representation—this, despite extensive evidence that the program may dramatically improve performance of various categories of retarded and low-achieving students when appropriately implemented (Savell, Twohig, & Rachford, 1986).

Additionally, such programs are often taught by specially trained teachers, so that they often preclude funding and training for teaching thinking in the content areas. Further, many of these programs do not teach students to think while reading or engaging in problem solving activities arising from real life or from problems typical in the disciplines, and there is little evidence that they transfer (Bransford, Sherwood, Vye & Rieser, 1986; Resnick, 1987). Thus, when funding for adjunct programs goes, all too often teaching thinking does too.

Some elements of the effective schools movement may also be classified as strategies of selection. A great achievement of that movement was demonstrating unequivocally that schools can make a difference for the academic achievement of students at risk. However, the gains made give this movement the illusion of dealing with instruction when in fact it is a *framework for schooling, not instruction*. So many schools associated with that movement prescribe isolated basic skills instruction for low-achieving students with little emphasis on constructing meaning and reasoning and, as some have pointed out, the gains are only modest (Levin, 1987; Levine & Cooper, 1991). It is not enough to move students from the 15th to the 23rd percentile; both effective schooling and excellent instruction are necessary for substantial gains.

Moreover, many big cities have initiated systematic retention guidelines to replace the social promotions policies that were customary during the past few decades. Some states and large cities are failing literally tens of thousands of students under these new policies. According to Levine and Cooper (1991), these policies may raise test scores from one year to another in very spurious ways. Systematic retention guidelines are another example of a program of instruction based perhaps more on political motives and strategies of selection than on actual instructional considerations. There is some evidence that such policies do not facilitate achievement, because the instruction usually consists of the same approach that did not work the first time, or it is focused on isolated skills (Shepard & Smith, 1990; Shepard, Smith, & Vojir, 1983). We do not really know what would happen if retention were coupled with good instruction.

It is amazing that so much time and effort have been spent in the reform movement on strategies of selection and so little on curricular reform and instructional strategies. In a recent survey of current reform strategies, the Center for Policy Research in Education identified five types of reform being widely implemented in urban districts: (1) efforts to increase the "effectiveness" of schools, curricula, and instruction, which includes efforts to focus more on basic skills and curriculum alignment, (2) alternative delivery systems such as pull-out pro-

grams and vocational education, (3) early childhood education programs, (4) social supports to prevent students from dropping out, and (5) cooperative partnerships. Thus, while there is some reference to instruction, the curricula for low-achieving students is focused on basic skills, and we see very little effort to upgrade teachers' knowledge of content subjects or train teachers to teach thinking within their regular courses. In fact, in a recent meeting attended by some forty school districts, only one school was identified as having a major focus on embedding the teaching of thinking within specific content subjects, even though that was recommended in some state curriculum guides.

POOR MANAGEMENT OF INSTRUCTION

The problems of trying to manage instruction equitably and yet not hold back bright students are very real. All the choices are difficult (Barr & Anderson, 1991; Brophy, 1988; Jones & Spady, 1985; Oakes, 1990; Slavin, 1987; Pink & Liebert, 1986). If you segregate the low achievers by tracking and pull-out programs, it stigmatizes them, and, in the final analysis, separate is as unequal now as it was in 1954. If you group students by ability within classrooms, it frequently functions like tracking, and, worse still, leaves most students doing mindless seat work while the teacher works with one of the groups at a time. Yet everyone fears that whole-group instruction will not address the needs either of the low achievers or the talented.

Further, while individualized instruction such as IEPs or continuous progress may be effective in teaching hierarchically sequenced skills *under certain conditions* (e.g., Madden & Slavin, 1987), the successes are almost universally in medium or small cities, which are free of the problems of teacher training and classroom management that beset large cities. There is also ample evidence of serious failures of individualized instruction, especially in large cities (Jones & Spady, 1985) and of pull-out programs for some categories of handicapped students, according to Gartner and Lipsky (1987). Such systems often lead to slow progress or no

progress, and, as indicated above, once in a separate program, a student is unlikely to be mainstreamed.

In summary, it seems that there is little justification for segregating the various mentally impaired students from each other and from regular students in separate, and radically different, programs of instruction. We cannot state with confidence that the causes of different types of mental impairments are directly related to mental deficiencies of the students, as opposed to test errors and poor learning environment, or that there are always, or even usually, significant differences among official categories. We have no official guidelines for selecting effective assessments and instructional approaches based on research. We have very little evidence that the instruction in isolated basic skills programs is successful in improving mental functioning by more than a few percentile points, which are only a fraction of the distance needed. These conclusions call for serious rethinking of what is funded under the aegis of Chapter 1 and other funding sources for students at risk. It is vital to the survival of this country to provide equal access to quality educational opportunities and to the mainstream of American society. Equal access is an imperative for national reform in the 1990s.

ARE THERE ANY SOLUTIONS?

We have been arguing that a substantial number of students in our schools today are at risk of failing to learn. The school's typical response to such students has been to categorize them and assign them to pull-out programs that fail to teach them the content and skills needed to succeed in our society. These practices must end. The solutions are difficult and many-faceted, but a number of recommendations rooted in educational research can be made.

One starting point is to redefine the problem. Rather than focusing on the categorical deficiencies of students at risk, we prefer to address the educational rights of all students. Recently, Keith Geiger, president of the National Education Association, has proposed that America should adopt a "Children's Bill of Rights," which would guarantee

the right to a good education. Darling-Hammond has agreed that every student should be entitled to certain educational rights: "Public education...is a right and an obligation made available to and required of its clientele. Because education is a right, it must be made available to all on equal terms. Because it is an obligation—an activity which is compulsory for children for most of their youthful years—the state must guarantee certain safeguards to ensure that no harm is done." (1988, p. 51). Precedent for this concept of entitlement was established in England in the 1980s. In 1983, a very broad-based group of educational stakeholders convened to determine what changes need to take place in schools to ensure that England's children would be prepared to participate effectively in the 21st century, and that England would continue to be successful in the decades to come. A major outcome of this meeting was a "consultative" document that discussed what curricular opportunities England should provide for its learners (Thwaites & Wysock-Wright, 1990). Some of the recommendations were addressed to the Prime Minister, others to the Secretary of Education or the general public.

The recommendations were ultimately embodied in a massive initiative of the Department of Manpower and Labor, referred to as the Technology, Vocation, and Education Initiative (TVEI). By providing 900 million pounds over ten years, TVEI guarantees three years of science, technology, and modern languages for students from fourteen to sixteen years of age, in addition to significant experiences in the workplace. Specifically, each student is to have an Individual Action Plan including work experience goals and training that will be documented in a Record of Achievement.

What does it mean in the United States to have the right to a good education? And how could it be "made available to all on equal terms"? We believe that students at risk should be entitled to the best of research and practice in four dimensions of schooling: the vision of learning, curriculum, quality of instruction, and assessment.

Vision of Learning

New visions of learning emerging from two broad strands of research, educational and cognitive psy-

chology, suggest that cognitive and affective dimensions of learning are highly integrated. This new research is a great step toward understanding the capabilities of students at risk. We argue that it is a right of all students to be in instructional environments based on such research, environments in which the teachers and administrators really do believe that all students can learn to think and experience academic self-esteem.

In terms of cognitive research, there are three broad arguments. First, there are new conceptions of intelligence as modifiable. Indeed, the concept of learning means that intelligence and achievement changes and grows according to the characteristics of the learner, the instructional environment, and the context. Feuerstein, Jensen, Hoffman, and Rand (1985), for example, speak about "cognitive modifiability," and there is ample evidence that even some of the most retarded can make significant gains in problem solving and complex learning, given appropriate instruction (Weinstein, Goetz, & Alexander, 1988; Savell, Twohig, & Rachford, 1986; Sharron, 1987; Hunt, 1972; Whimbey & Whimbey, 1975).

Second, intelligence is multi-dimensional. Gardner (1987) defines intelligence in terms of seven culturally valued dimensions. Verbal-linguistic and logical-mathematical intelligence have been emphasized almost exclusively by schools in the past. But many students are equally intelligent in solving visual-spatial, musical-rhythmical, bodily-kinesthetic, interpersonal, and intrapersonal problems. He argues that students should be permitted to demonstrate learning and problem solving in each of these areas.

Third, there is also a major focus on understanding thinking and learning as being strategic. This means that the successful learner develops a repertoire of learning and thinking strategies that are useful throughout life (Jones, Palincsar, Ogle, & Carr, 1987; Paris & Winograd, 1990; Rohwer, 1971). Strategic thinking is more than just figuring out whether to use summarizing, representing, or categorizing; it is a constant reaching for conceptual understanding and change, a perseverance in the face of inadequate information and frustrating circumstances. There is ample evidence that students at risk can be taught to

think strategically (e.g., Borkowski et al., 1990; Derry & Murphy, 1986).

These new ideas of learning as dynamic, multi-dimensional and strategic have profound implications for educators preparing students for the 21st century. They call into question the practice of categorizing students based on traditional measures, which assess only the cognitive-mathematical and verbal-linguistic dimensions of intelligence. These new notions of intelligence call for entirely new curricula, instruction, and assessment as well as new visions of student and teacher roles—not to mention of life-long learning.

The affective part of the vision of learning refers to students' academic self-esteem. Academic self-esteem refers to a sense of empowerment, or self-efficacy. Paris and Winograd (1990) have summarized literature which concludes that students use their assessment of their learning abilities to guide their efforts and use of strategies. If they do not think they can succeed—if they do not believe they are capable learners—they will not try hard (Butkowsky & Willows, 1980; Johnston & Winograd, 1985). But if they overestimate their abilities to succeed, they may again underestimate the need to work at learning (Canney & Winograd, 1979; Garner, 1987; Paris & Myers, 1981). Their beliefs about their chances for success or failure are closely related to their self-esteem (Carr & Borkowski, 1987), which is predictive of achievement (Calsey & Kenney, 1977; Marsh, 1986; Oka & Paris, 1987; Purkey, 1970). Because students' cognitive self-perceptions so strongly affect their readiness to apply themselves, Paris and Winograd have argued that students' metacognitive beliefs must include this view of themselves as intentional, self-directed, and self-critical learners "who can use strategies successfully." They need to understand that they are in charge of directing their cognitive efforts and that their success or failure is directly tied to those efforts. Above all, they need to believe that they can succeed if they put forth the effort.

These themes have been echoed by Covington, McCombs, and Dweck. Covington (1987) reported that students who attributed their performance to their effort (or lack of effort) were more likely to take control of their studies by using strategies. His

self-worth theory suggests that if educators work to change students' attributional beliefs about success and failure, they can affect students' feelings of self-worth and ultimately their achievement behavior.

McCombs (1986) has found that students' actions are initially motivated by innate needs to learn, to grow, and to be in control of the process. As information is being learned, it filters through to a student's self-esteem, which affects the learning process. When students feel that they are in control of their learning, they experience self-esteem. This generates a motivation to learn effectively. Students engage in autonomous, self-regulated learning in order to attain their goals of self-determination and self-development, as a consequence.

Dweck (1987) has contended that a student's definition of intelligence is central to his or her feelings of helplessness or control. Some students believe that intelligence is a fixed entity, reflecting innate ability, and is thus beyond their control. Others have a mastery interpretation, saying that intelligence can be enhanced as they acquire strategies and take control of their learning.

Curriculum

All students are entitled to access to a meaningful and challenging curriculum that prepares them for the needs of the 21st century. Banathy (1990) identifies five steps toward "the new learning agenda" needed to prepare students for the 21st century. We argue that all students are entitled to education according to the new learning agenda. First, it is important to make a shift toward higher order learning. Second, it is vital to develop competencies in various technologies. Third, all of us must learn to manage and shape change, if not to thrive on chaos. Fourth, we must develop a range of skills for cooperation and collaboration, including communication skills as well as dispositions to nurture and care for others. Fifth, Banathy calls for competence in systems thinking and action as a way for us to conceptualize and manage change, especially educational and social reform. Each of these steps will be discussed in turn.

According to Banathy, all students need to learn critical thinking skills such as decision-making and

problem solving, which necessitates a shift toward higher-order learning. When they are taught how, when, and why to use strategies, they will be empowered to take control of their learning. In this way, they will ultimately be prepared for powerful positions in society.

In the past, schools have been designed to develop workers for the industrial age. Now, we are entering a technological age, and we need to prepare students to learn about the new technologies, according to Banathy. Examples of the many new technologies include biotechnology, laser technology, microelectronics, knowledge processing, robotics, and computer-driven design. Although technologies become obsolete rapidly, it is vital to expose all students to an array of current technologies, so that they are aware of the power of various tools, feel comfortable in learning new technologies, and can envision themselves in jobs requiring the use of technologies.

Students who live in an ever-changing world need to be able to anticipate effects and implications of proposed changes, according to Banathy. This is very different from static learning. This new type of dynamic learning requires that students be aware of their creative potential, so they can imagine and evaluate future innovations. It also requires that students think flexibly, and there is ample evidence that students can be taught this skill as part of thinking strategically, adjusting strategies to new information and new parameters.

Students need to learn how to cooperate. We must prepare students for constantly meeting and working with a wide variety of people. Cooperative learning is very effective in teaching social values and skills as well as achieving cognitive goals across the curriculum and across grade levels. There are numerous and very powerful models of cooperative and collaborative learning, ranging from very structured cooperative approaches (e.g., Slavin, 1987), through more loosely structured approaches which actually teach students specific cooperative skills (Dansereau, 1985; Johnson, 1988), to very open-ended forms of collaborative learning in which there are fundamental changes in teacher and student roles as they learn together (Palincsar and Brown, 1985). Moreover, all of these approaches

have been field tested with students at risk and found to be highly effective, not only in changing achievement but also in building cooperative skills and in many cases changing self-concept and classroom climate.

Students need to learn how systems function and interconnect with other systems. The Education 2000 project at Redwood Falls, Minnesota, has developed school-based curricula focusing on social, political, and economic systems, physical science systems, evaluative and belief systems, and communicative and expressive systems (Education 2000 Project, 1990). Authors of the project state that "The curriculum should reflect the interdependence and interconnectedness of the people of the world. It should help learners understand themselves, their community, and their nation as part of a world that consists of interrelated physical, biological, economic, political, and social systems." (Education 2000 Project, p. 4). It is vital that all students have the opportunity to study and shape systems, to understand their complexities and common characteristics, both as an end in itself and as a means to learning to shape and manage change.

To Banathy's list, we would add the set of abilities that facilitate living in a global village (there is virtually nothing in schools in the United States that prepares citizens to live and work in other countries or to communicate with others living in our society); the right, if not the responsibility, of every citizen to be informed about environmental issues (while there are some efforts to educate the populace about these issues in schools, they are additions to the curriculum, not the core); the right and responsibility of every citizen to be informed about matters of physical and mental health; and opportunities to reconnect poor and minority students to positive visions of themselves and their role in society. So many programs for such students assume that they will not need high-order thinking or workplace skills for high-level jobs (Berryman, 1988). It is vital to provide rich opportunities to expose students to multiple life options, so that they can bond to the learning process and to society.

More recently, the Secretary's Commission on Achieving Necessary Skills (The SCANS Report,

1991) has identified five areas of skills that are vital for students in the 21st century, and a three-part foundation of skills and personal qualities necessary for solid job performance (Kane et al., 1990). The five areas of competency are defined as the ability to use:

- **Resources** - allocating time, money, materials, space, and staff;
- **Interpersonal Skills** - working on teams, teaching others, serving customers, leading, negotiating, and working well with people from culturally diverse backgrounds;
- **Information** - collecting and evaluating data, organizing and maintaining files, interpreting and communicating, and using computers to process information;
- **Systems** - understanding social, organizational, and technological systems, monitoring and correcting performance, and designing or improving systems;
- **Technology** - selecting equipment and tools, applying technology to specific tasks, and maintaining and troubleshooting technologies.

The foundation of these competencies consists of:

- **Basic Skills** - reading, writing, arithmetic and mathematics, speaking, and listening;
- **Thinking Skills** - thinking creatively, making decisions, solving problems, seeing things in the mind's eye, knowing how to learn, and reasoning;
- **Personal Qualities** - individual responsibility, self-esteem, sociability, self-management, and integrity.

We believe that students at risk have the right of access to a high-quality curriculum in each of these areas. It is vital not only as a moral issue but also as a matter of national competition and survival.

This emphasis on skills should not be taken to mean that we should teach "the new basic skills" as isolated skills. To the contrary. We would strongly argue for embedding these skills in curricula for

traditional subject areas *and* in interdisciplinary themes. This means not only upgrading subject area teachers on their expertise in the content areas; it also means high quality training in "the new basic skills" and training to infuse these skills into the curriculum.

Finally, Seldon (1991) argues that Chapter 1 students ought to have access to a full academic curriculum. This means that such students would be in the same classroom as regular students. Seldon also makes the case for accelerating Chapter 1 students so that they move faster in the various subject areas than other students (cf. Levin, 1986;1987). While this implies some type of compensatory education or pull-out program, it is an important political agenda as well as an academic one and should be explored thoroughly.

Quality of Instruction

In 1987, the Council of Chief State School Officials wrote that children and youth at risk of failing to graduate from high school should be guaranteed an educational program of the same quality provided for students likely to graduate. "Teach, don't label" is part of a title of an article on instruction for students at risk (Brown & Palincsar, 1987). It summarizes what many researchers and practitioners feel is a powerful guideline for the federal government and the schools to address the problem of labeling and segregation. Specifically, the theme of their article challenges the time and effort spent in categorizing special education students. We believe that all students are entitled to instruction that focuses on facilitating learning in heterogeneous groups, and less on categorizing and labeling.

Tracking by any name has not worked. We showed in previous sections that students in lower tracks have been denied opportunity to learn skills and content that would enable them to succeed in our society. They have received lower quality and quantity of instruction than students in the higher tracks, and they have been subjected to a more negative classroom climate. But the solution does not lie in more effective tracking. Students at risk cannot be segregated from high-track students, because pull-out programs threaten their self-es-

teem and are often of inferior quality. Moreover, all learners need to be prepared for the 21st century, by being exposed to a variety of students who are capable of expressing multiple perspectives. In addition, high-achieving students can benefit in multiple ways from heterogeneous groupings when collaborative learning and respect for cultural diversity are emphasized.

Creating heterogeneous groups that study traditional sequential curricula will not solve the problem either, according to Oakes (1986). Since students vary in their speed of learning, the slower ones would need to be taught and retaught, while the others wait for them to catch up. The solutions are multifaceted. As indicated above, Oakes maintains that instruction needs to take place in collaborative classrooms in which students learn from one another as they work together to develop cognitive strategies and that curricula must be concept-based, with students developing knowledge and skills at their own pace, while all students address the same general concepts.

Others, such as Barr and Anderson (1991), Allington (1991), and Slavin (1987) have developed various strategies for heterogeneous grouping and ability grouping combinations to have equitable outcomes. Jenkins et al. (1990; see also Gartner & Lipsky, 1988; Leinhardt et al., 1988) argue for a unified learning program. This approach argues that since instruction for remedial and certain handicapped students is so similar, it is not necessary to have categorical funding for separate instructional programs. Finally, some have argued for providing highly enriched school programs for African American male students (Ascher, 1991).

Equal education rights suggest new student and teacher roles as well as a heavy focus on teaching students cognitive and metacognitive strategies that work. Specifically, this means that teachers must value diversity and build on student strengths, serving as guides, coaches and facilitators. It also means providing teachers with access to the best knowledge and practice of what works with students at risk.

Several approaches designed specifically for students at risk have been used successfully in regular

classrooms: reciprocal teaching (Palincsar & Brown, 1985); explicit learning strategies instruction (e.g., Derry & Murphy, 1986); recent development using instructional software (Collins, 1991); a life-related curriculum (Bransford, Sherwood & Hasselbring, 1988; Sticht & Hickey, in press); and a variety of reading and math instructional strategies drawn from research on cognitive instruction (Bransford, Sherwood, Vye & Rieser, 1986; Harris & Cooper, 1985; Jones, Palincsar, Ogle & Carr, 1987; Resnick, 1987; Segal, Chipman, & Glaser, 1985; Weinstein, Goetz & Alexander, 1985; see also the special issue of *Educational Psychologist* on cognitive approaches in mathematics instruction, 1988).

We have the technology for heterogeneous practices, collaborative learning, and powerful instruction; it is primarily a matter of political will to figure out ways to train teachers and administrators to use it.

Multi-Dimensional Assessment

All students have a right to be assessed fairly and according to the learning opportunities provided. In the past, some educators have justified teaching isolated facts and lower-order intellectual skills because assessment instruments defined intelligence in those terms. Now we realize that students at risk can and must learn how to learn and think, that they can demonstrate thinking skills in various ways other than linguistic and mathematical, and that these skills should be tested in the context of authentic tasks.

Hand in hand with these new conceptions of intelligence come new tests. Today, for example, we have measures called dynamic assessment, which can assess a student's learning potential—what he or she can achieve given appropriate instruction in their zone of proximal development (Feuerstein, Jensen, Hoffman & Rand, 1985; Weinstein, Goetz & Alexander, 1988; Vygotsky, 1986). Statewide tests are being developed in Michigan, Illinois, and Wisconsin as well as the Degrees of Reading Power test, which aim to assess the "new" definition of reading—the process of constructing meaning from text. There are also new tests in mathematics to assess problem-solving capabilities and strategies (Lester, 1985; see also guidelines from the National Council of Teachers of Mathematics, 1989). Another type of test, performance-based assessment, is

being used to assess thinking on authentic tasks in a variety of settings (Wiggins, 1989). Students work on projects much like the types of work assignments encountered in the real world. They earn a diploma when they demonstrate their understanding through exhibitions of their work.

What Are the Implications for Policy?

In order to ensure the realization of the rights of students, a number of policy recommendations are in order. The strongest message that educational policy makers support restructuring would be allocating funds for schools' efforts to change outmoded structures and unwarranted assumptions (Oakes, 1989).

Policy makers must promote quality instruction based on the new visions of learning, curriculum, instruction, and assessment. Gartner and Lipsky (1989) have urged that schools be monitored and held accountable for using "best practices." Given that there is a repertoire of instructional strategies that are effective for teaching all students, shouldn't we expect schools to provide these for all students?

Similarly, Chapter 1 policies now recommend that all students need "higher order" thinking skills—not just the gifted and talented. Keating and Oakes (1988) have noted that governmental agencies which publicize racial breakdowns of students in the various tracks are helping raise public aware-

ness of some of the discrimination in tracking programs. Gartner and Lipsky (1989) have contended that PL 94-142 could serve as a vehicle to mandate a unitary system for all students. But currently over three million of the students served under PL 94-142 are in regular classes for less than twenty percent of their education.

In addition, policy makers should enable local school personnel to plan and develop the changes needed for effective unified learning programs. Keating and Oakes have contended that "policies can shift state and central-office administration away from mandating procedures toward building local-school capacity—with time, material resources, central office support and technical assistance, ongoing staff development opportunities at the site level and permission to redesign the system" (1988, p. 16).

The changes needed are many and complex. They start with basic redefinitions of the purposes of school for at-risk students. We know that students at risk are capable of succeeding in becoming self-regulated, strategic thinkers. But we need bold new leadership to create policies that will empower teachers and administrators to collaborate in school-wide restructuring of curriculum, instruction, and assessment. To those who ask, "Can we afford it?" the answer is "We can no longer afford not to."

REFERENCES

- Allington, R. L. (1991). How policy and regulation influence instruction for at-risk learners or why poor readers rarely comprehend well and probably never will. In L. Idol & B. F. Jones (Eds.), *Educational values and cognitive instruction: Implications for reform*. Hillsdale, NJ: Erlbaum.
- Allington, R. L., Stuetzel, H., Shake, M., & Lamarche, S. (in press). What is remedial reading?: A descriptive study. *Reading research and instruction*.
- Anderson, R. C., Hiebert, E. H., Scott, J. A., & Wilkinson, I. A. G. (1985). *Becoming a nation of readers: The report of the commission on reading*. Urbana, IL: University of Illinois.
- Anyon, J. (1980, Winter). Social class and the hidden curriculum work. *Journal of Education*, 162, 67-92.
- Aronson, L. (Producer). (1988). *Chicago schools: America's future*. Chicago: Station WTTW.
- Ascher, C. (1991, May). School programs for African American male students. *ERIC/CUE Trends and Issues No. 15*. New York: ERIC Clearinghouse on Urban Education, Teachers College, Columbia University.
- Banathy, B. H. (1990). *Systems design of education: A journey to create the future*. Englewood Cliffs, NJ: Educational Technology Publications.

- Banathy, B. H. (1988). Systems inquiry in education. *Systems Practice*, 1, 193-211.
- Barr, R., & Anderson, C. (1991). Grouping students for instruction in elementary schools. In L. Idol & B. F. Jones (Eds.), *Educational values and cognitive instruction: Implications for reform* (pp. 209-246). Hillsdale, NJ: Erlbaum.
- Berryman, S. E. (1988, April). *Education and the economy: What should we teach? When? How? To whom?* New York: Institute on Education and the Economy.
- Birman, B. F., Orland, M. E., Jung, R. K., Anson, R. J., Garcia, G. N., Moore, M. T., Funkhouser, J. E., Morrison, D. R., Turnbull, B. J., & Reisner, E. R. (1987). *The current operation of the Chapter I program: Final report from the National Assessment of Chapter I*. Washington, DC: U.S. Government Printing Office.
- Bloom, B. S. (1984). The search for methods of whole group instruction as effective as one-to-one tutoring. *Educational Leadership*, 41, 4-18.
- Bloom, B. S. (1976). *Human characteristics and school learning*. New York: McGraw Hill.
- Bloom, B. S. & Broder, L. (1950). *Problem-solving processes of college students*. Chicago: The University of Chicago Press.
- Borkowski, J. G., Carr, M., Rellinger, E., & Pressley, M. (1990). Self-regulated cognition: Interdependence of metacognition, attributions, and self-esteem. In B. F. Jones & L. Idol (Eds.), *Dimensions of thinking and cognitive instruction* (pp. 53-92). Hillsdale, NJ: Erlbaum.
- Bransford, J. D., Sherwood, R., & Hasselbring, T. (1988). Effects of the video revolution on development: Some initial thoughts. In G. Forman & P. Pufall (Eds.), *Constructivism in the computer* (pp. 173-201). Hillsdale, NJ: Erlbaum.
- Bransford, J. D., Sherwood, R., Vye, N., & Rieser, J. (1986). Teaching thinking and problem solving. *American Psychologist*, 41, 1078-1089.
- Brophy, J. (1988). Research linking teacher behavior to student achievement: Potential implications for instruction of Chapter I students. *Educational Psychologist*, 23, 235-289.
- Brown, A. L., Palincsar, A. S., & Purcell, L. (1986). Poor readers: Teach, don't label. In U. Neisser (Ed.), *The academic performance of minority children: New perspectives*, (pp. 105-143). Hillsdale, NJ: Erlbaum.
- Brown v. Board of Education of Topeka. (1954). U.S. Supreme Court. 347 U.S. 483, 484.
- Butkowsky, I. S. and Willows, D. M. (1980). Cognitive-motivational characteristics of children varying in reading ability: Evidence of learned helplessness in poor readers. *Journal of Educational Psychology*, 72, 408-422.
- Calsey, R. J., & Kenney, D. A. (1977). Self-concept of ability and perceived evaluation of others: Cause or effect of academic achievement. *Journal of Educational Psychology*, 69, 136-145.
- Campbell, A. B. (1991, July 8). NEA's Geiger Urges Nation to Ensure Children's Rights. *Educational Daily*, 24 (130), p. 1-2.
- Canney, G., & Winograd, P. (1979). *Schemata for reading and reading comprehension performance* (Tech. Rep. No. 129). Urbana, IL: Center for the Study of Reading.
- Carnegie Foundation Special Report. (1988). *An imperiled generation: Saving urban schools*. Princeton, NJ: The Carnegie Foundation for the Advancement of Teaching. (page 3b)
- Carr, J., & Borkowski, J. G. (1987, April). The importance of attributional retraining for the generalization of comprehension strategies. Paper presented at AERA, Washington, DC.
- Committee on Policy for Racial Justice. (1989). *Visions of a better way: A black appraisal of public schools*. Washington, DC: Author.
- Council of Chief State School Officers. (1987, November). *Assuring School Success for Students at Risk. A Council Policy Statement*. Washington, DC: Author.
- Covington, M. V. (1987). Achievement motivation, self-attributions, and the exceptional learner. In J. D. Day & J. G. Borkowski (Eds.), *Intelligence and exceptionality*, (pp. 355-389). Norwood, NJ: Ablex.
- Cuban, L. (1987, February 5). Policy seminar for educational leaders. *Conference proceedings of success for at-risk students*. Elmhurst, IL: North Central Regional Educational Laboratory.
- Dansereau, D. F. (1985). Learning strategy research. In J. W. Segal, S. F. Chipman, & R. Glaser (Eds.), *Thinking and learning skills: Relating instruction to research* (Vol. 1, pp. 209-240). Hillsdale, NJ: Erlbaum.
- Darling-Hammond, L. (1988). *Education reform and federal policy: Supporting perestroika and professionalism in the public schools*. Paper prepared for the Educational Policy Seminar, Aspen Institute.
- Derry, S. J., & Murphy, D. A. (1986). Designing systems that train learning ability: From theory to practice. *Review of Educational Research*, 56, 1-39.

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- Dweck, C. (1987, April). Children's theories of intelligence: Implications for motivation and learning. Paper presented at the annual meeting of the AERA, Washington, DC.
- Education Daily*. (June, 1988). Hawkins/Sta/Tord ESSIA Title I—Elementary and secondary act (ESEA) amendments.
- Education 2000 Project. (1990). Redwood Falls Site Independent School District 638, 4th and Lincoln, Redwood Falls, MN 56283.
- Educational Psychologist*. (1988, Spring). (Special Issue). Learning mathematics from instruction. Vol. 23.
- Fagan, T. W., & Heid, C. A. (1991). Program improvement: Opportunity and practice. *Phi Delta Kappan*, 72(8), 582-85.
- Feuerstein, R. (1980). *Instrumental enrichment*. Baltimore, MD: University Park Press.
- Feuerstein, R., Jensen, M. R., Hoffman, M. B., & Rand, Y. (1985). Instrumental Enrichment: An intervention program for structural cognitive modifiability: Theory and practice. In J. W. Segal, S. F. Chipman & R. Glaser (Eds.), *Thinking and learning skills, Vol. 1: Relating instruction to research*, (pp. 43-82). Hillsdale, NJ: Erlbaum.
- Feuerstein, R., Rand, Y., Hoffman, M. B., Epozi, M., & Kaiwel, S. (1991). Intervention programs for the retarded performer: Goals, means, and expected outcomes. In B. F. Jones & L. Idol (Eds.), *Educational values and cognitive instruction: Implications for reform*. Hillsdale, NJ: Erlbaum.
- Gardner, H. (1987). Developing the spectrum of human intelligence. *Harvard Educational Review*, 57, 187-193.
- Garner, R. (1987). *Metacognition and reading comprehension*. Norwood, NJ: Ablex.
- Gartner, A., & Lipsky, D. K. (1989). *The yoke of special education: How to break it*. Paper prepared for the National Center of Education and the Economy.
- Gartner, A., & Lipsky, D. K. (1987). Beyond special education. Toward a quality system for all students. *Harvard Educational Review*, 57, 367-395.
- Goodlad, J. E., & Oakes, J. (1988, February). We must offer equal access to knowledge. *Educational Leadership*, 45(9), 16-22.
- Gougis, R. (1986). *The school achievement of minority children: New perspectives*. U. Neisser, (Ed.). Hillsdale, NJ: Erlbaum.
- Harris, T. L., & Cooper, E. J. (Eds.). (1985). *Reading, thinking, and conceptual development: Strategies for the classroom*. New York: The College Board.
- Hodgkinson, H. L. (1988, February). The right schools for the right kids. *Educational Leadership*, 45(9), 10-14.
- Hodgkinson, H. L. (1985). *All one system: Demography of schools, kindergarten through graduate school*. Washington, DC: Institute for Educational Leadership.
- Hunt, J. M. (1972). *Human intelligence*. New Brunswick, NJ: Dutton.
- Jenkins, J. R. et al. (1990). Special education and the regular education initiative: Basic assumptions. *Exceptional Children*, 56(6), 479-91.
- Jensen, A. R. (1969). How much can we boost IQ and scholastic achievement? *Harvard Educational Review*, 39, 1-124.
- Johnson, D. W. (1988). *Advanced cooperative learning*. Edina, MN: Interactive Book Company.
- Johnston, P. and Winograd, P. (1985). Passive failure in reading. *Journal of Reading Behavior*, 17, 279-301.
- Jones, B. F. (1988). Toward redefining curriculum and instruction for students at risk. In B. Z. Presseisen (Ed.), *Students at risk and thinking: Issues and research perspectives*, (pp. 76-103). Washington, DC: National Education Association.
- Jones, B. F. (1986). Addressing quality and equality through cognitive instruction. *Educational Leadership*, 43, 4-12.
- Jones, B. F., & Idol, L. (Eds.). (1991). *Educational values and cognitive instruction: Implications for reform*. Hillsdale, NJ: Erlbaum.
- Jones, B. F., Palincsar, A. S., Ogle, D. S., & Carr, E. G. (1987). *Strategic teaching and learning: Cognitive instruction in the content areas*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Jones, B. F., & Spady, W. G. (1985). Enhanced mastery learning and quality of instruction as keys to two sigma results in schools. In D. U. Levine (Ed.), *Improving student achievement through mastery learning programs*, (pp. 11-43). San Francisco: Jossey-Bass.
- Kane, M., Berryman, S., Goslin, D., & Meltzer, A. (1990). *The secretary's commission on achieving necessary skills: Identifying and describing the skills required by work* (The SCANS Report). Washington, DC: Pelavin Associations, Inc.

- Keating, P., & Oakes, J. (August, 1988). *Access to knowledge: Breaking down school barriers to learning*. Paper prepared for the Education Commission of the States, Denver, CO.
- Lamar, J. V. (1988). Kids who sell crack. *Time*, 20-33.
- Leinhardt, G., Miller, S. E., & Zigmond, N. (1988). Influencing engagement through accommodation: An ethnographic study of at-risk students. *American Educational Research Journal*, 25(4), 465-487.
- Lester, F. K. (1985). Methodological considerations in research in mathematical problem solving instruction. In E. A. Silver (Ed.), *Teaching and learning mathematical problem solving* (pp. 41-69). Hillsdale, NJ: Erlbaum.
- Levin, H. M. (1987). Accelerated schools for disadvantaged students. *Educational Leadership*, 44, 19-21.
- Levin, H. M. (1986). *Educational reform for disadvantaged students: An emerging crisis*. Washington, DC: National Education Association.
- Levine, D. U. (1985). Key considerations for achieving success in mastery learning programs. In D.U. Levine (Ed.) *Improving student achievement through mastery learning programs* (pp. 273-274). San Francisco: Jossey-Bass.
- Levine, D.U., & Cooper, E. J. (1991). The change process and its implications in teaching thinking. In B. F. Jones & L. Idol (Eds.), *Educational values and cognitive instruction: Implications for reform*. Hillsdale, NJ: Erlbaum.
- Linn, R. (1991). Dimensions of thinking: Implications for testing. In B. F. Jones & L. Idol (Eds.), *Educational values and cognitive instruction: Implications for reform* (pp. 179-208). Hillsdale, NJ: Erlbaum.
- Madden, N. A., & Slavin, R. E. (1987, April). Effective pullout programs for students at risk. Paper presented at the annual meeting of the American Educational Research Association, Washington, DC.
- Marsh, H. W. (1986). Verbal and math self-concepts: An internal-external frame of reference model. *American Educational Research Journal*, 23, 129-150.
- Marzano, R., Brandt, R., Hughes, C., Jones, B. F., Presseisen, B., Rankin, S., & Suhor, C. (1988). *Dimensions of thinking: A framework for curriculum and instruction*. Alexandria, VA: Association for Supervision and Curriculum Development. (page 10d).
- McCombs, B. L. (1986). The role of the self-system in self-regulated learning. Paper presented at the annual meeting of the AERA, San Francisco.
- National Commission on Excellence in Education. (1983). *A nation at risk: The imperative for educational reform*. Washington, DC: Author.
- National Council of Teachers of Mathematics. (1989). *Curriculum and evaluation standards for school mathematics*, Reston, VA: Author.
- Nickerson, R. S., Perkins, D., & Smith, E. (1985). *The teaching of thinking*. Hillsdale, NJ: Erlbaum.
- Oakes, J. (1990). *Multiplying inequalities: The effects of race, social class, and tracking on opportunities to learn mathematics and science*. Santa Monica, CA: The Rand Corporation.
- Oakes, J. (1986, September). Keeping track, part 1: The policy and practice of curriculum inequality. *Phi Delta Kappan*, pp. 12-20.
- Oka, E. R., & Paris, S. C. (1987). Patterns of motivation and reading skills in underachieving children. In S. Ceci (Ed.), *Handbook of cognitive, social, and neurological aspects of learning disabilities* (Vol. 2, pp. 115-145). Hillsdale, NJ: Erlbaum.
- Paris, S. G., & Myers, M. (1981). Comprehension monitoring, memory, and study strategies of good and poor readers. *Journal of Reading Behavior*, 13, 5-22.
- Paris, S. G., & Winograd, P. (1990). How metacognition can promote academic learning and instruction. In B. F. Jones and L. Idol (Eds.), *Dimensions of thinking and cognitive instruction*, (p. 15-51). Hillsdale, NJ: Erlbaum.
- Pink, W. T., & Liebert, R. E. (1986). Reading instruction in elementary schools: A proposal for reform. *Elementary School Journal*, 87, 51-67.
- Porter, A. (1985, June). *Can a book be a curriculum?* Paper presented at a conference on Textbook Reform: A Cooperative Agenda, sponsored jointly by the National Association of State Boards of Education and the Council of Chief State School Officers, Washington, DC.
- Purkey, W. W. (1970). *Self-concept and school achievement*. Englewood Cliffs, NJ: Prentice-Hall.

EDUCATING FOR THE 21ST CENTURY

- Report of the Commission on the Skills of the American Workforce (1990). *America's choice: High skills or low wages*. New York: National Center on Education and the Economy.
- Resnick, L. B. (1987). *Education and learning to think*. Washington, DC: National Academy Press.
- Resnick, L. B., & Resnick, D. P. (1989). Assessing the thinking curriculum: New tools for educational reform. In B. R. Gifford & M. C. O'Connor (Eds.), *Changing assessments: Alternative views of aptitude, achievement, and instruction*. Boston: Kluwer Academic Publishers.
- Resnick, D. P., & Resnick, L. B. (1985). Standards, curriculum, and performance: A historical and comparative perspective. *Educational Researcher*, 14, 5-21.
- Rist, R. C. (1973). *The urban school: A factory for failure*. Cambridge, MA: MIT Press.
- Rohwer, W. D., Jr. (1971). Prime time for education: Early childhood or adolescence? *Harvard Educational Review*, 41, 316-341.
- Savell, J. M., Twohig, P. T., & Rachford, D. L. (1986). Empirical studies of Feuerstein's Instrumental Enrichment (FIE) technique as a method of teaching thinking skills. *Review of Educational Research*, 56, 381-410.
- Segal, J. W., Chipman, S., & Glaser, R. (Eds.). (1985). *Thinking and learning skills: Relating instruction to research* (Vol. 1). Hillsdale, NJ: Erlbaum.
- Seldon, R. (1991). (Personal communication).
- Sharron, H. (1987). *Changing children's minds: Feuerstein's revolution in the teaching of intelligence*. London: Souvenir Press.
- Shepard, L. A. & Smith, M. L. (1990). Synthesis of research on grade retention. *Educational Leadership*, 27, 84-88.
- Shepard, L. A., Smith, M. L. & Vojir. (1983). Characteristics of pupils identified as learning disabled. *Educational Research Quarterly*, 20, 309-331.
- Slavin, R. E. (1991). A vision for the next quarter century. *Phi Delta Kappan*, 72(8), 586-591-92.
- Slavin, R. E. (1987). Ability grouping and its alternatives: Must we track? *American Educator*, 11(2), 32-36.
- Slavin, R. E., & Madden, N. A. (1987, April). Effective classroom programs for students at risk. Paper presented at the annual meeting of the American Educational Research Association, Washington, DC.
- Sleeman, D., & Brown, J. S. (1982). *Intelligent tutoring systems*. London: Academic Press.
- Sternberg, R. J. (1985). *Beyond IQ: A triarchic theory of human intelligence*. Cambridge, England: Cambridge University Press.
- Sticht, T. G., & Hickey, D. T. (in press). Functional context theory, literacy and electronics training. In R. Dillon & J. Pellegrino (Eds.), *Instruction: Theoretical and applied perspectives*. New York: Praeger Publications.
- Task Force on Education for Economic Growth. (1983). *Action for excellence: A comprehensive plan to improve our nation's schools*. Washington, DC: Education Commission of the United States.
- Thwaites, B., & Wysock-Wright, C. (Eds.). (1990). *Education 2000: A consultative document on hypotheses for education in AD 2000*. London: Cambridge University Press.
- Tucker, M. S. (1988, February). Peter Drucker, knowledge work, and the structure of schools. *Educational Leadership*, 45, 44-46.
- Tucker, M. S. (1988). Peter Drucker, knowledge work, and the structure of schools. *Educational Leadership*, 45, 44-46.
- Vanecko, J. J., Ames, N. L., & Archambault, F. X. (1980). *Who benefits from federal education dollars?* Cambridge, MA: ABT Books.
- Vygotsky, L. S. (1986). *Thought and language* (rev. ed.). (A. Kozulin, Trans.). Cambridge, MA: The MIT Press.
- Weiner, R. (Ed.). (1991). New faces at school: How changing demographics reshape American education [Special supplement]. *Education Daily*, 24 (167).
- Weiner, R. (1985). P. L. 94-142: *Impact on the schools*. Washington, DC: Capitol Publications.
- Weinstein, C. E., Goetz, E., & Alexander, P. (1988). *The teaching of learning strategies: Issues in assessment, instruction, and evaluation*. New York: Academic Press.
- Whimbey, A., & Whimbey, L. S. (1975). *Intelligence can be taught*. New York: E. P. Dutton.
- Wiggins, G. (1989). A true test: Toward more authentic and equitable assessment. *Phi Delta Kappan*, 70, 703-714.

RESTRUCTURING LEARNING FROM THE INSIDE OUT

1456, 1903, 1953, 1963

What do these years have in common?

1456, Gutenberg printed the first Bible on his printing press.

1903, The Wright brothers flew their first flight at Kitty Hawk.

1953, Noble & Kilous produced the first silicon chip.

1963, Martin Luther King delivered his "I Have A Dream" speech.

These years mark some of the most significant events in restructuring the history of the world. For better or for worse, these events changed the substance of the social order for all time; from each event flowed a new ordering of life that caused dramatic reconceptualization of the status quo.

With entry into the decade of the 1990s a new call for the reconceptualization of our schools emerged as high technology surged forward into every corner of society. "Restructuring" became the buzz word of the educational establishment, as schools scrambled to realign themselves with the paradigm shifts endemic to the technological era. In some states, legislators have mandated that schools become restructured. In Washington, there is the push for "break-the-mold" schools that will fit in America 2000. In other states school districts are latching onto "outcome-based" education as a cure-all.

History shows, however, that paradigm shifts come from within. Restructuring is not an event to be mandated, legislated, or imposed from without. Rather, it is an ongoing process of change and renewal within organizations and within individuals—a restructuring of core values and perceptions.

In this section, our authors avoid "tinkering" mandates and call for substantive school renewal and redesign. Educational issues at the *mega* level of national policy-making open this section. Next, at a *macro* level of change, community and school concepts are turned inside out as schools are depicted as learning communities and the distinction between tinkering and transformation is made clear. Continuing with the domino effect as the metaphor for systemic change, the remaining chapters in this section focus on the *micro* level within the schools and look at adult learners, their willingness to change, and effective human resource development models that truly transform. The section closes with a vision of that transformation.

IF MINDS MATTER... POLICIES FOR THE FUTURE

Rexford Brown

Most schools in the United States can boast that they have some teachers who know how to challenge and develop every student's mind. Most district superintendents can boast that they have some schools where all students are being intellectually challenged and some innovative pilot programs that involve students actively in critical and creative thinking, inquiry, problem solving, and other elements of a literacy of thoughtfulness. But few are the districts in which it can honestly be said that all teachers and schools are fully developing all students' minds and a literacy of thoughtfulness is the primary pursuit rather than an exceptional undertaking. At a time when business and political leaders are calling for *system change*, rather than just *school change*, we need to understand more fully why school systems seem to tolerate only as much critical literacy, intellectual change, and innovation as will not dramatically change the status quo.

Explanations for the persistence of a school system that is inhospitable to a robust literacy for all children are undoubtedly complex and involve countless cultural and educational factors. But among the more salient factors at work are the very

politics of education in this country and the influences of education policy on the people in and around the system. If classrooms and schools are to be restructured around the aim of having all students fully use their minds, classroom and school environments will have to be quite different than they are today. And if those environments are to change, educational policies and politics will have to change as well. To see why, we must begin by describing the kind of classroom and school environment that reformers are striving for and then work backward to the political and policy influences necessary to support such educational environments.

WHAT GOES ON INSIDE CLASSROOMS AND SCHOOLS WHERE MINDS MATTER?

Before talking about schools, we should keep this caveat in mind: if we are truly to restructure education, today's classrooms and schools may not be the appropriate settings to discuss. The ideal learning environment for strengthening minds is wherever a mind is confronting engaging or compelling problems to be solved and someone is there to help

mediate the learning. That may be in a building or it may not.

Certain beliefs, practices, and commitments are honored in learning environments where all students are being challenged to use their minds fully. Primary among the beliefs is the assumption that all students can, in fact, learn whatever they are motivated to learn, work hard to learn, and are given appropriate opportunities to learn. This belief is given widespread lip service by educators and policymakers, but it is contradicted by many elements of current policy and practice, such as tracking, ability grouping, and inequitable allocations of resources. In a school where "minds matter," lip service doesn't cut it. Teachers, administrators, staff, parents, and students spend a good deal of energy discovering how and at what pace each student learns best and creating the appropriate opportunities for that learning to take place, sink in, and get applied in meaningful ways. Those opportunities come first; scheduling, school organization, and adult workplace needs come second.

Another fundamental understanding shared by all the adults in a school where minds matter is that learning is an active, constructive, community-building process. The literacy students learn is not an inert thing or a set of skills that can be acquired passively; it is a way of being and acting, a primary way for people to reveal and change the conditions in which they live. Literacy is about constructing meaning and negotiating it with others in one's growing community. Fully literate people see knowledge as a contingent, evolving phenomenon, not just as something that adults pass on to unquestioning children, like hand-me-down clothes. Each of us has to interpret the facts and experiences around us and weave them into constructs about who we are, how the world works, and how we fit in with or change the world around us.

These rather modest-sounding propositions—that all kids can learn, that learning is an active process, that literacy involves thinking and meaning-making, and that knowledge evolves—bring about profound changes in learning environments when students and educators take them seriously. (Taking something seriously means constantly exploring it, questioning it, and deepening under-

standing of it). When you observe these environments, you see that all parties—adults as well as young people—are actively engaged in learning and in expanding the boundaries of their literacy. You see a learning focus, instead of a teaching focus. The classrooms and halls are richly textured with student and adult books, art by students and great artists, science and history projects, toys, games, machines, animals, plants, tools, and countless things students have brought in to discuss. Desks are not always arranged in rows; often they're in circles and sometimes they don't even exist.

Because it is grounded in a robust notion of literacy, the optimal learning environment sounds as different as it looks. There is far less teacher talk and far more student talk. And the talk itself is different: there is more questioning, more open-endedness, more "suppose that..." and "what if?" and "what do you think?" Teachers and students encourage each other to clarify or expand their ideas. They put ideas into different forms in order to better grasp and communicate them. During discussions, students provide evidence or reasons for their views and ideas, summarize for each other, critique both the ideas and the discussion itself (Did it lead anywhere? What did people learn? Who was included and excluded?). You hear respectfulness and sensitivity and forthrightness. You hear tentativeness and guessing and inquiry and making mistakes out loud. You hear people talking about their thinking, aware of their language, and taking time regularly to reflect on what they have learned.

What you experience in a school where minds matter is a language of learning. It is characterized by its democraticness, its give-and-take, its personal quality, and the honesty and courage of its speakers, whatever their age. It stands in marked contrast to the language that dominates most classrooms and schools today, a language I've come to call "talkinabout," because people seem to be talking about reading but not actually reading, talking about writing but seldom actually writing, and so on. Talkinabout is a language of bureaucratic control, of organizing to learn rather than actually learning. It is a form of instrumental rationality, a

language of getting things done, administering, treating people generically, and moving them toward undiscussed, predetermined goals. It is marked by its impersonality (expressed through heavy reliance on the passive voice), its linearity (goals, objectives, subobjectives, sub-subobjectives, scopes, sequences, steps, and so forth), its preference for nouns instead of verbs, its preference for abstractions and jargon, its claims to be value-neutral, objective, and definitive. Learning experiences, on the other hand, are anything but impersonal, linear, passive, abstract, value-neutral or objective.

In a school where minds matter, you are likely to find much more student time devoted to significant reading, purposeful writing, and applied mathematics than you would see in a traditional school. You will see more short- and long-term student projects—experiments, for instance, or scientific models, historical studies, economic analyses, biographies, or even entrepreneurial activities. Student experience constitutes a much larger portion of the curriculum. You will see much more collaborative learning, teamwork, mentoring, and peer tutoring. Everyone takes turns being learner and teacher. Teachers and students are more willing to scrap lesson plans to take advantage of unforeseen events and able to move back and forth more easily between cognitive learning and social experience. Adults from around the community wander in and out of the learning environment, serving as resources, reflectors, tutors, lecturers, and good all-around role models.

Moving outside of the classroom, you will notice that adult interactions in a school where minds matter are different from interactions in a typical school. Adults tend to read more and to talk about what they have read lately. Faculty tend to be better listeners and better able to work cooperatively. English teachers might talk to each other about writing, for instance (rare in a typical school) or work with science teachers on an interdisciplinary project (even rarer). Faculty meetings involve discussion of ideas, not just the usual focus on processes, materials, and complaints. People tell you that their meetings are well run and satisfying,

not whiny and interminable and without resolution. You are more likely to see teams of teachers trying to solve common problems, rather than individuals plugging along in isolation. Teachers visit each others' classrooms and observe each other in action—something that takes an unusual amount of trust and confidence. Staff development is something people take seriously and enjoy; it is not the butt of jokes, as it is in most schools.

Under such circumstances, traditional notions of management, leadership, and decision making yield to new interpretations. Schools where minds matter need management as much as any organization does, but you will find changes in what gets managed, who does the managing, and how it gets done. To begin with, children are expected to be better self-managers, relieving adults of some of their traditional disciplinary duties. Children who are engaged in active, meaningful learning experiences are far less troublesome to adults and far more likely to enjoy and profit from increased responsibilities. Management tends to be close to the problems that need managing, rather than remote: teachers deal with curriculum and instruction issues that are handled "downtown" in traditional school districts; principals and teacher/parent teams make decisions for their schools, rather than deferring to the central bureaucracy; logistical requirements and issues of working conditions, hiring, and firing are more likely to be dealt with in the context of the school as a learning community rather than as unrelated bureaucratic matters. Leadership tends to be more authoritative, rather than authoritarian; people with the right expertise take the lead at the right time and yield it when someone else's leadership makes more sense. The job of leadership is seen as entailing empowerment of others, unleashing their creative energies, and getting out of the way.

All of these conditions are tendencies and exist in degrees. I am not suggesting that schools where minds matter are little utopias where the usual frustrations of working with children have somehow magically disappeared. Teaching remains and always will be an extremely difficult job, an "impossible profession," as David Cohen has pointed out most forcefully (Cohen, 1988). Arguments surface,

tensions arise, and contract disputes and grievances come up, just as they do in other schools. But when the differences in beliefs and actions I have enumerated add up to a critical mass in a school, they make significant, observable differences in the learning environment and the achievements of students.

We know that individuals have created these conditions in their classrooms and that groups have done so in assorted schools. This tells us that it can be done on a limited scale within the current framework of education and policy and politics. But those who have succeeded often talk of having done so "against the odds" or "in spite of the system" or for only a short period of time or with only ideal students and unusually favorable conditions. The demand these days is to do it on a massive, not a limited, scale, and for all students, not just the easy ones. What would have to change in policy and politics to help ensure that the conditions I have just described could flourish throughout a large school system?

POLICIES CONDUCTIVE TO CREATING AND SUSTAINING OPTIMAL LEARNING ENVIRONMENTS

Each of the elements of an optimal learning environment can be supported or thwarted by one or more district or state policies or policy clusters. I am using the word policy broadly, to include:

- *executive mandates*: e.g., President Bush's declaration that the United States shall be first in science and mathematics achievement by the year 2000 or a state-department-of-education-mandated minimum competency test;
- *legislative actions*: e.g., comprehensive school reform acts or school finance laws; or
- *judicial rulings*: e.g., school desegregation rulings and ensuing court monitoring of a district.

I include federal, state, and local policies affecting:

- *curriculum*: e.g., graduation requirements, Chapter I basic skills guidelines, Connecticut's "Common Core of Learning," or a

district-mandated mastery learning curriculum;

- *assessment*: e.g., the National Assessment of Educational Progress or the New York State Regents Examinations or the Pittsburgh syllabus-driven examination program;
- *instruction*: e.g., teacher certification and tenure regulations, state-mandated teacher examinations, or district staff development policies.
- *management and leadership*: e.g., state principal certification standards or district policies on rotating principals;
- *organization*: e.g., mandated site-based decision-making councils, collective bargaining agreements, teacher reward and compensation policies, or accountability systems based on standardized test scores; and
- *finance*: e.g., federal policies with respect to flexibility in use of federal funds, state block grants, district policies affecting schools' capacity to spend or reallocate money.

In all of these areas, some people are policy makers (for example, legislators, board members, or union heads) and many more people are interpreters and implementers of policy—rule makers and program makers, if you will. The whole concatenation of policies, laws, rules, interpretations, regulations, and programs constitutes the policy environment within which educators carry on their work. I have speculated elsewhere about how all this affects the behavior of individuals in classrooms (Brown, 1991a). Suffice it to say here that it creates a symbolic environment within which people establish formal roles and relationships and tend to talk about or do some things but not others. Policy acts as a kind of "metadiscourse" that rationalizes the system and affects the conversations going on, the questions being raised or not raised, up and down the system. That means it has a direct influence on literacy both in terms of what it says about literacy and how it embodies a certain form of literacy.

Before linking the conditions for optimal learning that I listed above to specific policy clusters and

characteristics, I want to emphasize that the policy environment is only one of a number of influences on educators and students. Influences of family, background, and the larger culture and practical exigencies explain much that people do in organizations. Changes in how policy is derived, how it is articulated, and what it says, can, however, with the right kind of leadership, bring about noticeable changes in organization culture. Some cultures open up more possibilities than others for the kinds of robust learning opportunities we need in schools where minds matter.

With that in mind, what would an optimal policy environment look like? To begin with, the state and the district would ask explicitly for the optimal learning conditions I described above. The state would ask for them through the governor, in his or her speeches and school visits. The state board of education would work on it by establishing a vision for education in the state, publishing various documents, rewriting state code, holding hearings on the future of education, and processing requests for the rule waivers from districts trying to create optimal learning conditions. The state department of education could address the issue through its curriculum frameworks, its tests, its technical assistance and reward programs. The legislature could ask for these changes through its hearings, its reform packages (including school finance), and the speeches of its members. Statewide groups such as blue-ribbon business task forces, the state PTA or PTO, the state chamber of commerce, and other groups can work with policymakers to bring media attention to new goals and higher expectations.

Currently, we have fragments of this going on in a number of states. Vermont and Kansas have published inspiring visions of their states' educational futures; North Dakota has a long-range strategic plan; Connecticut, Maine, and California have published robust statements about what all children should be learning. Multi-term governors like Romer of Colorado or Clinton of Arkansas have pushed for school restructuring for years; Governor Gardner of Washington has made "all children can learn" a national theme and has called for all new state standards. The South Carolina legislature

has said a basic skills curriculum will not suffice and the board of education there has rewritten code that seemed to get in the way of reform. State and district leaders in Delaware, Rhode Island, Arkansas, Illinois, and New Mexico have embraced the principles of the Coalition of Essential Schools; Connecticut, New York, and California departments of education are calling for exhibitions and performance assessments of higher and more complex literacies. The Kentucky Supreme Court has ruled the Kentucky system unconstitutional and mandated a new system restructured around student learning of the kind we have been describing. Pittsburgh, San Diego, and Cincinnati are calling for more critical and creative thinking and problem solving for all students; Birmingham, Rochester, Miami, Louisville, and Milwaukee are trying to restructure their systems to focus more on learning.

As encouraging as these trends are, no state has yet put the whole package together in a compelling way. Candidates for political office still say we must "go back to the basics", as if going backward will get us into the twenty-first century; as if we ever left the basics; as if basic skills will get anyone a decent job in today's market; and as if a system that focuses solely on basic skills will ever produce a workforce that can compete in the international economy. State departments of education still crank out endless and incoherent lists of minimum competencies, goals, and objectives more appropriate for the nineteenth than the twenty-first century.

School policy still supports, directly and indirectly, the notions that learning is a function of intelligence, not effort; and that intellectually challenging academic work requires high intelligence, which nature provides only in limited quantities. Much of the work of schooling has to do with sorting students in order to find the limited number of young people with the requisite intelligence. Course assignments, curricular materials, and instruction vary for different groups of students according to how adults in the system estimate their aptitude, usually with "ability" tests. Although many districts have expunged tracking from their public policy agenda, most continue to see ability grouping as a sensible, even equitable,

educational policy and sound practice (Oakes, 1985). Students in "gifted and talented" classes and in college prep courses are more likely to be challenged to use their minds well than students in regular or vocational classes. Students in remedial and compensatory programs are seldom challenged to think critically or creatively (Brown, 1991a; Powell et al., 1985; Goodlad, 1984). In many districts, the explicit policy is that students must "master the basics" before they can be allowed to do interesting or challenging intellectual work. So deeply rooted are our nineteenth-century notions about intelligence and learning, so intent have schools been on sorting students, that one is hard put to find a major stream of policy or aspect of practice that does not reinforce the belief that only a few students—the "brains"—have the ability to learn the best of what the schools have to teach.

So just to ask in a coherent way for something more and better just to stimulate a community conversation about what Johnny and Mary really need in order to be happy, healthy, and productive adults, would be a profound policy shift. Then to spell out the optimal learning conditions and to be clear about what is required if students and adults throughout the system are to be learners would be immensely beneficial.

To say that it is the policy of this state that all students will learn—and that it is the responsibility of the schools to see that they are motivated to do so and are given the appropriate conditions in which to do so—would be a big step. To say that learning is an active, constructive process of making meaning and that, as a consequence, schools must engage all students and enable them to use their minds fully—and to say that communities will hold schools accountable for providing active learning for all students—would be a revolutionary change in policy. Such statements—printed and spoken by leaders up and down the system, debated and improved upon in forums across the state and community—would create the kind of larger discourse necessary to legitimate people who are already moving in this direction. It would also embolden others to venture ahead and force the rule makers and program makers to begin removing structural barriers and imagine new ways of

organizing time, space, and money to get the new job done.

This is the role of policy: to say that there is a new, exciting job to be done, a new challenge that will require the imagination and resourcefulness of everyone in the system; to promise that those who come forth to meet that challenge will be empowered to do what is necessary and rewarded for their efforts; to vow to remove the barriers to their efforts and to provide the support necessary to modify existing institutions or invent new arrangements and organizations as needed.

The policies that will support schools where minds matter will be explicitly linked to a concrete vision of a much higher level of literacy for a much broader range of people than ever in our history. What that means will be spelled out. They will force collaboration, consultation, and joint learning among groups that do not usually work in tandem, just as classroom teachers and business leaders must force people to work together in new ways. They will force rule makers and program makers to reconceptualize fundamental elements of the system, such as how time is used, how money is spent, what constitutes a curriculum, how we can know if students are learning or if whole schools are moving ahead or if whole districts are making progress. They will call attention to the effectiveness of the entire system, not just individual schools, forcing a system-consciousness on the community, a public good for the public schools. These policies will create incentives for people and groups to move ahead and rewards for their accomplishments. They will set broad parameters and general directions but will not overspecify, leaving details and problems to be dealt with by the people best able to work them out. They will be flexible policies, allowing for innovation, evolution, discovery, and diverse ways of carrying out their spirit.

Clearly, politics as usual will not lead quickly to the kinds of policies I have described. Single interest group politics, which fragment the reform agenda and push each issue through the political process without any context or relation to other issues, can only make an already confusing system virtually incoherent to the public. Partisan politics, which attach "good" and "evil" to reform proposals

and programs, conceal any common ground and often make enemies of people who are working toward the same ends. Education politicians who sling mud at their opponents only get it all over the children they are supposed to be helping. Politicians who say they have the one best answer, the silver bullet, only deepen public skepticism and cynicism. Short term politics—"I'm in office for two years and I want to see some results before I run again"—lead to simplistic debates about the wrong things and backslapping progress reports that no one believes. Ethnic politics too often pit one child's needs against another's, obscuring what both need, and tearing apart communities that can only solve systemic problems if they stay together. The politics of scarce resources leads inevitably to draconian solutions and program slashing with no thought to reallocation or to new categories or new kinds of information about the system that might dictate different approaches. State education politics in general seems crisis-oriented, unstrategic, indecisive, and lacking in vision. Leadership with backbone seems never to exist in all the right places at the same time.

District politics in general seems trivialized and rudderless. Fewer than ten percent of the eligible voters participate in elections, school boards cave in easily to any organized group, however unrepresentative of the community; and boards spend enormous amounts of time arguing about everything except what counts. Huge bureaucracies that

emerged to do the day-to-day work of schooling increasingly create de facto policy and serve as the only sure source of stability (and mediocrity) amidst the political hurly-burly. Collective bargaining too often brings on a season of teacher bashing or school-board bashing rather than a serious inquiry into how teachers, board members, administrators, and everyone else will face the profound changes that lay in wait for every one of them, as surely as there is a tomorrow.

Some will argue that "politics is politics" and will never change. Some will say that this is how politics has always been conducted and the country has grown and prospered in spite of (or perhaps even because of) its ways of doing political business. Some will rightly observe that huge social policy changes and pieces of current education reform agenda have already arisen out of traditional politics, so there is reason to be hopeful.

I am hopeful that our political culture will evolve and that as it does so, the kind of policy environment described above will become increasingly possible. But politics as usual will only evolve into something better as events expose its tragic shortcomings and policymakers are held accountable for higher standards. If minds matter as much to the future of this country as many farsighted thinkers believe they do, education policies will be forced to change, grudgingly; policy will change, haltingly; systems will change, tempestuously; and schools will change—happily, I think, for all of us.

REFERENCES

- Brown, R. (1991a). *Schools of thought: How the politics of literacy shape thinking in the classroom*. San Francisco: Jossey-Bass, Inc.
- Brown, R. (1991b). Policy and the rationalization of schooling. In E. Hiebert (Ed.), *Literacy for a diverse society: Perspectives, programs, and policies*. New York: Teachers College Press.
- Cohen, D. (1988). *Teaching practice: Plus ça change...* East Lansing: Michigan State University, National Center for Research on Teacher Education.
- First, J., Kellogg, J., Almeida, C., and Gray, R. (1991). *The good common school: Making the vision work for all children*. Boston: National Coalition of Advocates for Students.
- Fiske, E. B. (1991). *Smart schools, smart kids*. New York: Simon and Schuster.
- Goodlad, J. (1984). *A place called school*. New York: McGraw Hill.
- Oakes, J. (1985). *Keeping track*. New Haven, CT: Yale University Press.

RESTRUCTURING LEARNING FROM THE INSIDE OUT

Powell, A., Cohen, D., & Farrar, E. (1985). *The shopping mall high school*. Boston: Houghton Mifflin.

Schlechty, P. (1990). *Schools for the 21st century*. San Francisco: Jossey-Bass.

Sizer, T. (1992). *Horace's school: Redesigning the American high school*. New York: Houghton Mifflin.

Toch, T. (1991). *In the name of excellence*. New York: Oxford University Press.

THE LEARNING COMMUNITY

Arthur L. Costa

Many factors influence teachers' subconscious thinking as they make daily decisions about curriculum, instruction, and the content to be taught. These include their own culture, knowledge of content, cognitive style, and professional values and beliefs about education. Their knowledge of students' needs and their perceptions of students' abilities and backgrounds influence their judgments about when to teach what to whom. The available resources of instruction—the tests, materials, equipment, textbooks, as well as time and space available—all impact teachers' instructional strategies.

Less obvious, but vastly more persuasive influences on teacher thought include the norms, culture, and climate of the school setting in which teachers work. Hidden but powerful cues emanate from the school environment in which the teaching staff is immersed. These cues signal the institutional value system which governs the operation of an organization (Saphier & King, 1985).

Jack Frymier (1987) states:

In the main, the bureaucratic structure of the workplace is more influential in determining what

professionals do than are personal abilities, professional training or previous experience. Therefore, change efforts should focus on the structure of the workplace, not the teachers.

Recent efforts to bring intellectual, cooperative, and empowered focus to our schools will prove futile unless we create a school environment that signals the staff, students, and community that the development of the intellect, cooperative decision making, and the enhancement of individual diversity are of basic importance as the school's core values. Efforts to enhance the staff's instructional competencies, develop curriculum, revise instructional materials and testing procedures, and pilot and adopt published programs may be important components in the process of implementing cognitive education. It is also crucial, however, that the school climate in which teachers make their decisions be aligned with these goals of development of intellectual potential. I would propose the following hypothesis: that teachers will more likely teach for thinking if they are in an intellectually stimulating environment themselves.

Unfortunately, schools have been found to be intellectually depressing places, not only for stu-

dents but for teachers as well (Goodlad, 1984). Several factors contribute to these bleak cognitive conditions:

- Teachers often lack a sense of power and efficacy. They are often cast at the bottom of a hierarchy while the curricular, inservice, and evaluation decisions affecting them are handed down from above.
- Teachers feel isolated. We are probably the only profession that performs our most beautiful and creative craft behind closed doors. Contributing to this situation is the inadequate amount and inflexibility of time for teachers to meet, plan, observe, and talk with each other.
- The complex, creative, intelligent act of teaching is often reduced to a recipe, a simplistic formula, or a series of steps and competencies, the uniform performance of which is naively confused with excellence in the art of teaching.
- The feedback of data about student achievement is used for political, competitive, evaluative, or coercive purposes. It neither involves nor instructs the school staff members in reflecting on, evaluating, and improving their curriculum and instructional decisions.
- Educational innovations are often viewed as mere tinkering with the instructional program. They are so frequent and yet so limited in impact that teachers, in their frustration, sometimes say, "This, too, shall pass." Instead of institutionalizing the change, deeply entrenched traditional practices and policies in the educational bureaucracy remain static. Testing, reporting, securing parent understanding and support, teacher evaluation, scheduling, school organization, discipline procedures and the like are seldom revised to be in harmony with the overall innovation.

Under such dismal school climate conditions, some teachers understandably grow depressed. Those teachers who possess vivid imagination, altruism, creativity, and intellectual prowess may

soon succumb to the humdrum daily routines of unruly students, irrelevant curriculum, impersonal surroundings, and equally uninterested co-workers. In such an environment, the likelihood that teachers will value the development of students' intellect is marginal.

TOWARD A SCHOOL AS A COMMUNITY OF DEVELOPING MINDS

Teachers are more likely to teach students to think in an environment they themselves find to be intellectually stimulating and cooperative. When teachers are in a school which signals, promotes, and facilitates their intellectual growth, they will gradually align their classrooms and instruction practices to promote students' intellectual growth as well. As teachers teach students to think, become more aware of conditions that promote student thinking, and become more powerful thinkers themselves, they will demand and create school climate conditions that are intellectually growth-producing as well. Thus, respect for intelligent behavior grows to pervade all levels of the institution.

I propose three environmental conditions that facilitate the intellectual growth of all the school's inhabitants. These conditions are: (1) all participants share a common and continually evolving vision of the school as a community for developing the minds of all who dwell there; (2) the processes of thinking are the content of curriculum and instruction; and (3) schools and classrooms are interdependent, cooperative communities. These environmental conditions may provide a sharper image of schools and classrooms that are dedicated to becoming communities where human minds continue to develop during the process of striving to develop human minds.

A Common Vision

Effective organizations are characterized by a strong and deep sense of purposefulness and a vision of the future. There is a high degree of alignment of members at all levels involving a commitment to that shared vision. There is a shared

sense of ownership and internal responsibility for performance (Harmon, 1988).

Faith in Human Intellectual Potential

In the environment where intellectual growth is promoted, thinking is valued not only for students and certified staff, but for classified staff as well. There exists a faith that all human beings can continue to grow and improve their intellectual capacities throughout a lifetime. All of us have the potential for even greater giftedness, creativity, and intellectual power. Students, teachers, and administrators realize that learning to use and continually refine their intelligent behavior is the purpose of their education. They continue to operationally define and clarify that goal and seek ways to gain assistance in achieving it.

Such a belief is expressed in many ways. School staff's commitment is reinforced when they are able to report and share progress toward installing thinking in their schools and classrooms. The superintendent reviews with site administrators their long-range goals and progress toward including the development of thinking skills in the school's mission. Teachers keep journals and portfolios and periodically share with their colleagues new insights about lessons and activities to teach cognitive skills.

Philosophy, Policies, and Practices

This vision is also expressed in the school board's purposes and policies. The goals of enhancing reasoning and problem-solving behavior are explicitly stated in the school district's philosophy and mission statement. District policies and practices are constantly scrutinized for their consistency with that philosophy. Evidence of their use as criteria for decision making is examined. Furthermore, procedures for continuing study, refinement, and improvement of district-wide practices encourage schools to keep growing toward increasingly thoughtful practice.

Personnel practices, for example, reflect the desire to infuse thinking. Job specifications for hiring new personnel include skills in teaching thinking. Teachers are empowered to make decisions that

affect them—providing a greater sense of efficacy. Supervision of and staff development for all certified staff are focused on enhancing their perceptions and intellectual growth and honor their role as professional decision makers (Costa & Garmston, 1985).

Selection criteria for instructional materials also contribute to intellectual development. Counseling, discipline, library, and psychological services are constantly evaluated for their enhancement of and consistency with thoughtful practice. Discipline practices are designed to appeal to students' thoughtful behavior. Students participate in generating rational and compassionate classroom and school rules and are involved in evaluating their own behavior in relation to those criteria (Curwin & Mendler, 1988).

Protecting What's Important—Saying "No" To Distractions

When your goals are clear, your day-to-day decisions are easy. Knowing that thinking, cooperation, and individuality are the important goals, all inhabitants of the school believe that their right to think will be honored. This overarching and primary goal will be kept in focus as decisions are made. Teachers' rights to be involved in the decisions affecting them are protected and those who do not choose to be involved in decision making are also honored in their choice.

This goal may often be tested as pressures from public and vocal special-interest groups potentially distract us from our central mission. Our vision may be temporarily obscured by politically expedient and financially parsimonious decisions. Fads and other educational "panaceas" which distract from our intellectual focus must be ignored as irrelevant to our central issue. We must have the strength to examine these distractions for their relevance to the development of thoughtful human beings.

Such philosophical discussions should be encouraged because they give voices to alternative views. Considering other points of view creates tensions, honors divergent thinking, and expands and refines our vision. Such discussion encourages staff

members to include divergent modes of thinking and inquiry in their classroom interaction. It strengthens the staff's commitment to the principle that to learn anything—cultural literacy, basic skills, or your golf swing—requires engagement and a transformation of the mind. Since change and growth are viewed as intellectual processes, not events, we value the time invested in ownership, commitment, and learning over extended periods of time.

Communications

Embedded in an organization's communications are expressions of what it prizes. Scan any newspaper and you will find a reflection of a society's values in its major sections: sports, business and finance, and entertainment.

As a school becomes a community of developing minds, thinking skills will increasingly pervade all forms of communication in the school. Report cards, parent conferences, and other forms of progress reports include indicators of students' growth of intelligent behaviors. Indicators include asking questions, metacognition, flexibility of thinking, persistence, listening to others' points of view, creativity, and so on (Costa, 1985).

Growth in students' reasoning abilities is assessed and reported through a variety of methods, including teacher-made tests, use of student journals, structured observations, and interviews. Portfolios of students' work can display growth in organizational abilities, conceptual development, and increased creativity. Test scores include measures of reasoning, vocabulary growth, critical thinking, reasoning by analogy, problem solving, and fluency.

Newspaper articles are written to keep the community informed. Calendars and newsletters sent home inform parents and the community of the school's intent and progress in teaching thinking (Diamandis & Obermark, 1987-88). Parent education meetings are held to help parents enhance their child's intelligent capacities and behaviors. (Feldman, 1986).

Students maintain journals, portfolios, and video tapes to record their own thinking and

metacognition and to share and compare their growth of insight, creativity, and problem-solving strategies over time. Parents, too, are invited to collect evidence of transference of their child's intellectual growth from the classroom to family and home situations.

Mottos, slogans, and mission statements are visible in classrooms, schools, and throughout the district and community. "Washington Schools are Thoughtful Schools" is painted on one district's delivery trucks for all the community to observe. Bookmarks are distributed to parents, service organizations, and visitors reminding the community that thinking is the school's goal. "Thought Is Taught At Cloverdale High" is the logo on the school's note pads. "My Child Is An Effective Thinker" is blazoned on bumper-sticker prizes awarded to parents. "Make Thinking Happen" is printed on a school's letterhead stationery. "We're Training Our Brains" is the motto on buttons proudly produced, sold, and worn by the students.

Collegiality

The essence of collegiality is people in the school community working together to better understand the nature of intelligent behavior, cooperation, and group development. Professional collegiality at the district level is evident when administrators form support groups to assist each other and when teachers and administrators from different schools, subject areas, and grade levels form networks to coordinate efforts to enhance intelligent behavior. Committees and advisory groups assess staff needs, identify talent, and participate in district-level prioritizing and decision making. They support and provide liaisons with school-site efforts; plan district-wide inservice and articulation across grade levels to enhance teachers' skills; and develop an aligned, coordinated, and developmentally appropriate curriculum for students.

Selection committees for instructional materials review and recommend adoption of materials and programs to enhance students' thinking. Through district-wide networks, teachers share information and materials and teach each other about skills and strategies they have found to be effective.

At the school level, teachers plan, prepare, and evaluate teaching materials. Teachers visit each other's classrooms frequently to coach and give feedback about the relationship between their instructional decisions and student behaviors. Together they prepare, develop, remodel, and rehearse lessons. They then observe, coach, and give feedback to each other about their lessons.

Teachers and administrators continue to discuss and refine their vision of the school as a community for developing minds. Definitions of thinking and the teaching and evaluation of students' intellectual progress are continually clarified. Child-study teams keep portfolios of students' work and discuss each student's developmental thought processes and learning styles. Teams explore instructional problems and generate experimental solutions. Faculty meetings are held in classrooms where the host teacher shares instructional practices, materials, and videotaped lessons with the rest of the faculty. Teacher teams plan for continuity, reinforcement, and assessment of thinking skills across grade levels and subject areas.

An Environment of Trust

People are more likely to develop in higher-level, creative, experimental thought when they are in a trusting, risk-taking cooperative climate. Because higher-order thinking is valued as a goal for everyone in the school, the school's climate needs to be monitored continually for signs of stress that might close down complex and creative thinking. Risk taking requires a non-judgmental atmosphere where information can be shared without fear that it will be used to evaluate success or failure.

A climate of trust is evident when experiments are conducted with lesson designs, instructional sequences, and teaching materials to determine their effects on small groups of students (or with colleagues before they're used with a group). Various published programs and curriculums are pilot-tested, and evidence is gathered over time of the effects on students' growth in thinking skills. Teachers become researchers when alternate classroom arrangements and instructional strategies are tested and colleagues observe student interactions.

Tangible Support

Like radio transmitters, teachers, school administrators, and other leadership personnel send signals to the staff, community, and students about what is important. It is the way in which these educators expend their valuable and limited resources—time, energy, and money—that signals the organization's value system. In environments that empower developing minds, administrators use their time and energy to visit classrooms to learn more about and coach instruction in thinking. Teachers expend their valuable time in planning lessons and observing each other teach for thinking. Time in classrooms is also allocated to teaching and discussing thinking.

In the school that is becoming a community of developing minds, financial resources are allocated to promote thinking. Substitutes are hired to enable teachers to visit and coach each other. Staff members and parents are sent to workshops and other inservice opportunities to learn more about the teaching of effective thinking. Funds are provided to purchase and test new thinking-oriented instructional materials and programs. Time is allocated to plan for and train teachers in their use and to gather evidence of their effectiveness. Consultants are hired for long-range planning and inservice training. Faculty meeting time is used to discuss and report new learnings about intellectual development and implications generated for program improvement. Critical incidents are described and analyzed as indicators of students' improvements in application of creative thinking skills and dispositions.

Thus, the whole school community—students, teachers, administrators, classified personnel, board members, and parents share a common vision of the school as a home for the mind. They continually work to sharpen that image, clarify their goals, and align daily practices with that vision of the effective thinker.

Process as Content

Our obsession with the boundaries of content is what keeps school staffs separated. Until we con-

sider thinking as the core of the curriculum and use content based on its contributions to the thinking and learning process, we shall continue to endure this dilemma. The sooner we admit that thinking process is the content, the sooner we will find ways to infuse thinking throughout the curriculum. In the school that is becoming a community of developing minds, the intellect, learning to learn, knowledge production, metacognition, decision making, creativity, and problem solving are the subject matter of instruction. Content is selected because it promotes these processes and thus becomes a vehicle of thinking.

Our focus is on learning from the objectives instead of learning of the objectives. Transference, application, and the production of knowledge replaces mere acquisition of knowledge.

Caring, Celebrations, and Humor

The value of thinking is exemplified in an organization's traditions, celebrations, and humorous events that indicate its mission is being achieved. Staff members are overheard sharing humorous anecdotes, jokes, and stories about students who, as a result of instruction, display their thought processes. The following incident is just one example: "I observed two sixth grade boys on the playground yesterday. I could tell a scuffle was about to break out. Before I got to them another boy intervened and I overheard him say, 'Hey, you guys, restrain your impulsivity.'"

Teachers and administrators share their personal, humorous, and sometimes embarrassing anecdotes of their own lack of thinking. Examples include tactics for remembering peoples' names, strategies for finding their "lost" car in the parking lot, or creative solutions to the dilemma of locking their keys in their car.)

At career days local business and industry leaders describe the reasoning, creative problem solving, and cooperative skills that are needed in various jobs and occupations. At school assemblies students and teachers are honored for creativity, cooperation, thoughtfulness, innovation, and scholarly accomplishments. Academic decathlons, thinking fairs, problem-solving tournaments, dialogical debates, invention conventions, science fairs,

art exhibits, and musical programs all celebrate the benefits of strategic planning and cooperative efforts.

Students in the classroom are recognized and rewarded for displaying those behaviors that the school values: persevering, striving for precision and accuracy, cooperating, considering another person's point of view, planning ahead, and expressing empathy. Students applaud each other for acts of ingenuity, compassion, and persistence.

Continuing to Learn—Expanding the Knowledge Base

Knowledge about thinking and the teaching of thinking is vast, complex, uncertain, and incomplete (Marzano et al., 1987). No one will ever know it all; nor would we wish to reduce it to a simplistic step-by-step lesson plan (Brandt, 1987). Teachers and administrators are in a continuous growth state, learning more and adding to their repertoire of instructional skills and strategies.

Another attribute of a school that is becoming a community of developing minds, therefore, is that it continually expands its knowledge base instead of striving for conformity to certain specified instructional competencies. Knowing that the school's mission is to develop the intellect and that the process is the content, each teacher strives to invest thoughtful learning, craftsmanship, and metacognition into all instruction. Teachers continually expand their repertoire of instructional skills and strategies intended to develop in students a wide range of reasoning, creative, and cooperative abilities. They draw their content goals from this vast repertoire—of subject matter and instructional techniques and strategies—taking into consideration students' characteristics and the context in which they are working. They vary their lesson designs according to students' developmental levels, cognitive styles, and modality preferences (Jones, 1987).

While their students expand their range of intellect behaviors, teachers and administrators might pursue course work in specific disciplines and in philosophy, logic, and critical thinking. They strive to improve their own thinking skills and strategies. These behaviors might include not only knowing

how to perform specific thought processes (Beyer, 1985), but also knowing what to do when solutions to problems are not immediately known—study skills, learning to learn, reasoning, problem solving, and decision-making strategies (Marzano & Arredondo, 1986). They make discoveries about their own cognitive styles and how to cooperate with others who have differing styles. They learn how to cause their own creative juices to flow by brainstorming, inventing metaphor, synectics, and concept mapping.

Schools and Classrooms as Interdependent, Cooperative Communities

Humans, as social beings, mature intellectually in reciprocal relationships with other people. Together, individuals generate and discuss ideas eliciting thinking that surpasses individual effort. Together and privately, they express different perspectives, agree and disagree, point out and resolve discrepancies, and weigh alternatives. Because people grow by this process, collegiality is a crucial climate factor in the school as a community of developing minds.

Group Problem Solving and Decision Making

All the school's inhabitants will be committed to the improvement of school climate, interpersonal relationships, and the quality of human interaction. Students and classified and certified personnel strive for precision of language, understanding, and empathy. They practice and improve their listening skills of paraphrasing, empathizing, and clarifying.

At school board, administrative, and faculty meetings decision-making processes are discussed, explicated, and adopted. Process observers are invited to give feedback about the group's effectiveness and growth in their decision-making, consensus-seeking, and communication skills.

Furthermore, each group member's opinions and questions are respected. Disagreements are stated without fear of damaging the relationship. Debates and critical assessment of alternate points of view are encouraged. Responsibility for errors, omissions, and inadequacies are owned without blaming others. Responses are given and justified

and new ideas advanced without fear of being criticized or judged. Differing priorities, values, logic, and philosophical beliefs of group members are discussed and become the topics of analysis, dialogue, understanding, and further question generating.

Modeling

Learning to think is probably best learned through imitation and emulation of others. All adults in the school that is becoming a home for the mind, therefore, would strive to model in their own behaviors those same qualities that are desired in students. Modeling would be evident as teachers and administrators share their metacognitive strategies in the presence of students and others while they are teaching, planning, and problem solving (Jones, 1987).

Staff members would restrain their impulsivity during emotional crises. They would listen to students, parents, and each other with empathy, precision, and understanding. Teachers and administrators would constantly reflect on and evaluate their own behavior and strive to make it more consistent with the core belief that thoughtful behavior is a valid goal of education.

The Ultimate Mission: Enhancing Student Thinking

A common vision, process as content, and the school as a community are not ends in themselves. We must constantly remind ourselves that the reason we construct our schools in a given fashion is to serve our youth.

As these cornerstones and building blocks of school climate are gradually cemented into a sturdy foundation, teachers—living in and growing from this culture—will in turn create a classroom that supports growth in students.

The vision of education as the development of critical thinking and cooperative abilities is evident as students deliberate and persevere in their problem solving, as they work to make their oral and written work more precise and accurate, as they consider others' points of view, as they generate questions, and as they explore the alternatives and consequences of their actions. Students engage in

increasingly rigorous learning activities that challenge the intellect and imagination. Such scholarly pursuits require the acquisition, comprehension, and application of new knowledge and activate the need for perseverance, research, and increasingly complex forms of problem solving.

Since processes of thinking are explicitly stated as the content of lessons, they become the students' direct tasks. The metacognitive processes engaged in while learning and applying the knowledge are discussed. Thus students' thinking becomes more conscious, more reflective, more efficient, more flexible, and more transferable.

Collegiality is evident as students work together cooperatively with their "study-buddies," in learning groups, and in peer problem-solving situations. In class meetings students are observed learning to set goals, establish plans, and set priorities. They generate, hold, and apply criteria for assessing the growth of their own thoughtful behavior. They take risks, experiment with ideas, share thinking strategies (metacognition), and venture forth with creative thoughts without fear of being judged. Value judgments and criticisms are replaced by accepting, listening, empathizing with, and clarifying each other's ideas (Costa, 1985).

The Greeks had a word for it: *paideia*. The term, popularized by Adler's *The Paideia Proposal* (1983),

is an ideal concept we share: a school in which learning, fulfillment, and becoming more humane are the primary goals for all students, faculty, and support staff. It is the Athenian concept of a learning society in which self-development, intellectual empowerment, and life-long learning are esteemed core values and all institutions within the culture are constructed to contribute to those goals.

As Willis Harmon (1988) states: "By deliberately changing their internal image of reality, people are changing their world." We can change our future world to become more compassionate, thoughtful, and cooperative. Our future is in our classrooms today.

IN SUMMARY

The development of thinking and collegiality goals of education is not just kid-stuff. Education will achieve an intellectual focus when the school becomes a home for the mind for all who dwell there; when the total school is an intellectually stimulating environment for all the participants; when all the school's inhabitants realize that freeing human intellectual potential is the goal of education; when they strive to get better at it themselves; and when they use their energies to enhance the intelligent behaviors of others.

REFERENCES

- Adler, M. (1983). *The paideia proposal: An educational manifesto*. New York: Macmillan.
- Beyer, B. (1985). Teaching critical thinking: A direct approach. *Social Education*, 49(4), 297-303.
- Brandt, R. (1987). On teaching thinking skills: A conversation with B. Othanel Smith. *Educational Leadership*, 45(2), 35-39.
- Costa, A. (1985). Teacher behaviors that enhance thinking. In A. Costa (Ed.), *Developing minds: A resource book for teaching thinking*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Costa, A., & Garmston, R. (1985). Supervision for intelligent teaching. *Educational Leadership*, 42(5), 70-80.
- Curwin, R., & Mendler, A. (1989). *Discipline with dignity*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Diamandis, L., & Obermark, C. (1987-88, December - January). Critical thinking activities for kindergarten children. *Bright ideas—A newsletter for parents*, 2(2).
- Feldman, R. D. (1986, November 11). How to improve your child's intelligent behavior. *Women's Day*, pp. 60-68.
- Frymier, J. (1987, September). Bureaucracy and the neutering of teachers. *Phi Delta Kappan*, pp. 10.
- Goodlad, J. I. (1984). *A place called school: Prospects for the future*. New York: McGraw Hill.

- Harmon, W. (1988). *Global mind change*. Indianapolis, IN: Knowledge Systems, Inc. (Published in cooperation with the Institute of Noetic Sciences, Sausalito, CA.)
- Jones, B. F. (1987). Strategic teaching: A cognitive focus. In B. F. Jones, A. S. Palincsar, D. Ogle, & E. Carr (Eds.), *Strategic teaching and learning: Cognitive instruction in the content areas*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Marzano, R., & Arredondo, D. (1986). *Tactics for thinking*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Marzano, R., Brandt, R., Hughes, C., Jones, B. F., Presseissen, B., Rankin, S., & Suhor, C. (1987). *Dimensions of thinking*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Saphier, J., & King, M. (1985). Good seeds grow in strong cultures. *Educational Leadership*, 42(6), 67-74.

A RESTRUCTURING JOURNEY

Barrie Bennett and Carol Rolheiser-Bennett

Janson (1991) quotes Michelangelo describing the anguish and joy of creativity when he stated that creativity was like "liberating the figure from the marble that imprisoned it." (p. 44-45)

Most people are amused at the simplicity and visual imagery of Michelangelo's description. In our quest to find and apply the essence of effective classrooms and schools, the array of variables is so great that one wishes the simple wisdom of Michelangelo could be applied—that we liberate the school from the context that imprisons it. Our task, unfortunately, is more complex than creating a single work of art or implementing a single innovation. So where does that leave us in our journey to restructure the classrooms and schools of today so that they meet students' needs of the present and future? It leaves us trying to focus on those factors that truly make a difference in the lives of all learners within a school.

Despite the complexity of the task, we have all heard about, or been members of, school staffs that have created classrooms and schools that meet our current dreams for restructuring. For example, in

Macrorie's book, *20 Teachers* (1984), we get snapshots of teachers who have created powerful learning environments. In Bosch's (1991) research we get snapshots of principals in three schools who are working intensely and successfully at addressing some of the deeper issues related to how classrooms and schools improve—issues such as collaboration, collegiality, consensus building, vision, and building norms of continuous improvement. So, from the optimist's perspective, we recognize that we are capable of creating examples of success.

From the pessimist's perspective, however, those principals, teachers, and schools appear to be the exception and not the rule. For example, in Louis' and Miles' book, *Improving The Urban High School* (1990), we can read case studies of five schools that worked at implementing the characteristics of effective classrooms and schools. At the time the data were analyzed (four years later), two schools were assessed as successful, two were still struggling, and one was worse than when the project started. Given the intensity of their efforts in terms of time and money, two out of five is not encouraging.

If we take the ratio of those results to a district level where forty schools might be attempting to

improve, then only sixteen schools would likely be successful. There can be little doubt that, if restructuring as a movement is to be considered successful, then we have to move beyond the isolated pockets of successful classrooms and schools to the point where success becomes a school district norm. Fifty percent is mediocre. Few are satisfied with a mediocre haircut, a mediocre heart surgeon, or a mediocre meal in a restaurant. So the question remains, "Why are we willing to accept or perpetuate educational mediocrity when what is at stake are the hearts, minds, and souls of our students?"

Louis' and Miles' study reminds us that many school staffs want much more than mediocrity and are doing something about improving their classrooms and schools. In the same breath, the study reminds us that this difficult task lacks a clear blueprint for success. Given the obvious concern to improve education, why have so many educators in classrooms and schools failed in their attempts to improve? Although we do not purport to have the answers, we do have a framework that helps make sense of the vast array of variables.

The framework we will use in this chapter provides an insight into creating successful classroom and school improvement through valuing teachers and students as life-long learners. Importantly, that framework sheds light on how classrooms and schools improve through focusing on an "inner" perspective while simultaneously realizing the intimate connection between groups of schools and the entire school system. The current trend for many school systems is to move away from centralized management systems to more decentralized or site-based management systems. The pendulum of belief has swung in favor of decentralized approaches. However unless attention is paid to how classrooms and schools improve, the graveyard of decentralized innovations will be just as full of failed attempts as innovations initiated from the more centralized approaches.

The pursuit of a strategy focused on restructuring schools from the inside is not a guarantee of district level success. Done in an unthinking manner, it continues to create small pockets of success at best, and most certainly maintains the prevailing

winds of mediocrity. Nonetheless, if the restructuring is done based on what we know about best practices, restructuring from within provides one viable avenue to increasing the chances of improving the quality of education.

In this chapter we start with a brief description of the context of our work and follow that with a discussion of the dilemma mentioned above, describing three specific traps we have observed to occur when schools are restructured from within. Next, a functional and practical framework is extensively explored—a framework that encourages a more caring and thoughtful approach to successfully restructuring schools from within. A final look at restructuring through David Perkins' idea of *Knowledge as Design* (1986) concludes the chapter.

THE LEARNING CONSORTIUM: A Context for Classroom and School Improvement Efforts

The ideas presented in this chapter have emerged from our work over the last three years with the Learning Consortium—a university and school district partnership in Canada that brings together educators from the University of Toronto, the Ontario Institute for Studies in Education (OISE), and the Durham, Halton, North York, and Scarborough Boards of Education. The districts are large, ranging in size from 45,000 students (90 schools) to 70,000 students (165 schools). In our work at initiating, implementing, and sustaining classroom and school improvement changes, our efforts have included an emphasis on restructuring schools from within with a parallel emphasis on district level partnering.

Educators attempting to initiate and sustain change agree that one of the greatest educational challenges is leading and managing the process of change. Within the Learning Consortium we have taken up that challenge. The Learning Consortium is a living laboratory, where we apply our knowledge of the process of change to ourselves, and, through such efforts, are coming to understand the management of the process in new ways. We believe our efforts have incorporated thoughtful and enthusiastic approaches to encourage more than

small pockets of classrooms and schools to succeed. More importantly, though, we believe our approach represents only one part of a mosaic of approaches to create effective learning environments for students and teachers.

We have found that consciously valuing teachers and students as learners has been a critical component in our journey to restructure our schools. The mandate of the Consortium focuses on valuing teachers throughout their careers. Such a continuum meaningfully responds to teachers' needs and capitalizes on their strengths as they enter and move through a career in education. We have maintained a constant instructional focus and have consciously continued to arm all stakeholders with knowledge of the change process. Additionally, all teacher development and school improvement activities undertaken by the Consortium are made meaningful through a spirit of inquiry, whereby we make use of previous research and produce new findings.

THE TRAPS OF RESTRUCTURING SCHOOLS FROM WITHIN

The terms *centralized* and *decentralized* refer to where decisions are made, as well as the extent to which individual school staff members are collaboratively involved in decision making. The decentralized approach encourages the idea of a self-managing school, where the school staff make decisions concerning the allocation of resources related to curriculum, teaching, learning, people, time, and finance (Caldwell and Spinks, 1988). Encouraging the school to become autonomous has certain ideal benefits such as increased professionalism for teachers, combined with the parallel responsibility to improve. Isolating the school as an independent unit of change creates three problems: isolated competition; magnetic destruction; and keen unpreparedness.

Isolated competition encourages individual school staffs to ignore the collective responsibility to meet the needs of all schools in the district. For example, as a staff takes more responsibility for decisions that focus on *their* vision related to *their* curriculum, *their* students, *their* parents, *their* community, and *their* staff development program, there

is no parallel concern for the efforts within other schools. Although this problem is also found with a centralized approach, the difference is that the chances are then increased that schools will ignore their responsibility to other schools, and that the process of change will become a competition which blocks staffs from attending to and caring about the successes and failures of other district schools. That leads to the problem of "magnetic destruction."

Magnetic destruction is a problem that results when a successful school in a decentralized board acts like a magnet to attract the best teachers from other schools within the district. That attraction occurs due to the school's positive reputation or as a result of active solicitation by a school-based administrator striving to increase the quality of teaching within the school. Although the idea of improving a school by creating a powerful community of educators within that school is essential, building such a community at the expense of other schools within the district does little to improve the overall effectiveness of the district. In the long run it will at best sustain district-wide mediocrity.

For example, in one Canadian school district recognized for its intensive efforts at school-based reform, one school had been involved in an intensive teacher effectiveness program for six years. Each year, two or three teachers would be involved in a year-long program focused on instruction. For one teacher, the cost of involvement in the professional development program would be about \$2,500 according to a conservative estimate. A principal of an inner-city elementary school within that district stated, "We have been involved in the program for six years and sponsored eleven teachers' participation in the program, yet we still don't have any remaining teachers in our school who have been through that program. Once they finish, they are 'attractive,' and hence sought by other schools. That saves the other school money, but does little to help us. As an inner-city school, we just keep losing out. The rich get richer, and the poor get poorer."

Schools stand little chance of improving without outside support from the community, the local university or college, other schools, or the district office. Interactive leadership between schools, and between schools and a central office are essential.

The Halton Board of Education, one of the Learning Consortium partners, for example, models such practices through district-sponsored programs such as their Leadership Effectiveness Assisted by Peers (LEAP) program, in which principals from different schools form coaching partnerships to jointly attend a series of year-long leadership sessions.

Keen unpreparedness surfaces when the decisions as to what and how to change are placed in the hands of a school staff who may not be appropriately armed with a knowledge of change, or skill in managing the change process. Just as we would be unlikely to complete a triathlon successfully without some understanding and skill related to the process of implementing multiple innovations without some understanding and preparation regarding the process of change. Unfortunately, the training and experience we get as teachers or administrators in this area does little to prepare us for implementing change. In the Louis and Miles study, for example, the one variable that differentiated the effective from the less effective schools was the ability of the staffs of the effective schools to confront and resolve conflict. This factor was one important tool for successfully managing the change process.

The three concerns just described—isolated competition, magnetic destruction, and keen unpreparedness—are mentioned in the context of our observations that schools are moving from the centralized to the decentralized side of the continuum. We envision the school, both conceptually and in practice, as the center of change (rather than the unit of change), with the district working in partnership to support a high level of effectiveness at all schools in the district. By taking this stance, we have moved away from polarizing around a centralized or decentralized approach, and moved toward some point on the continuum that allows for a form of negotiated interaction between leadership at the school and district levels, as well as leadership between schools. Through partnership, those three seemingly independent entities (classrooms, schools, and districts) are mutually aware of what is being changed and of the

process by which they will change. Such a process sees classrooms evolving simultaneously with the schools and district. Nonetheless, as mentioned above, merely taking an interactive stance at some point on the continuum between centralization and decentralization is insufficient for improving classrooms and schools—teachers, school leaders, and district leaders must have a collective and parallel understanding and desire to improve classrooms and schools.

RESTRUCTURING FROM WITHIN: A Framework for Classroom and School Improvement

The rest of this chapter centers on an evolving framework that has developed out of our previous work in Canada and the United States, as well as our efforts with the Learning Consortium over the last three years. The framework in Figure 1 is an advance organizer, illustrating how ideas affect, and are affected by, other ideas (see Joyce and Weil, 1986 for more information on advance organizers). Although the purpose of the framework is not to indicate where to start, it does provide a structure through which educators can inquire into the current condition of their schools or classrooms and predict what factors might need consideration as they move toward their definition of effective classrooms and schools.

Before proceeding with a description of the framework, a comment is necessary about the imagery of 'gears' and 'cogs.' Taken literally, the framework is misleading—teaching is not mechanistic, nor do we believe that one cog drives another. Rather, the framework is a *metaphor* of movement, which illustrates that elements in classroom and school improvement affect one another in an interactive, dynamic way. Our goal has been to understand classroom improvement on the one hand, school improvement on the other, and then to identify systematic links between the two. We have found that change must occur in all three dimensions simultaneously in order for change to be initiated, implemented, and sustained in any dimension individually.

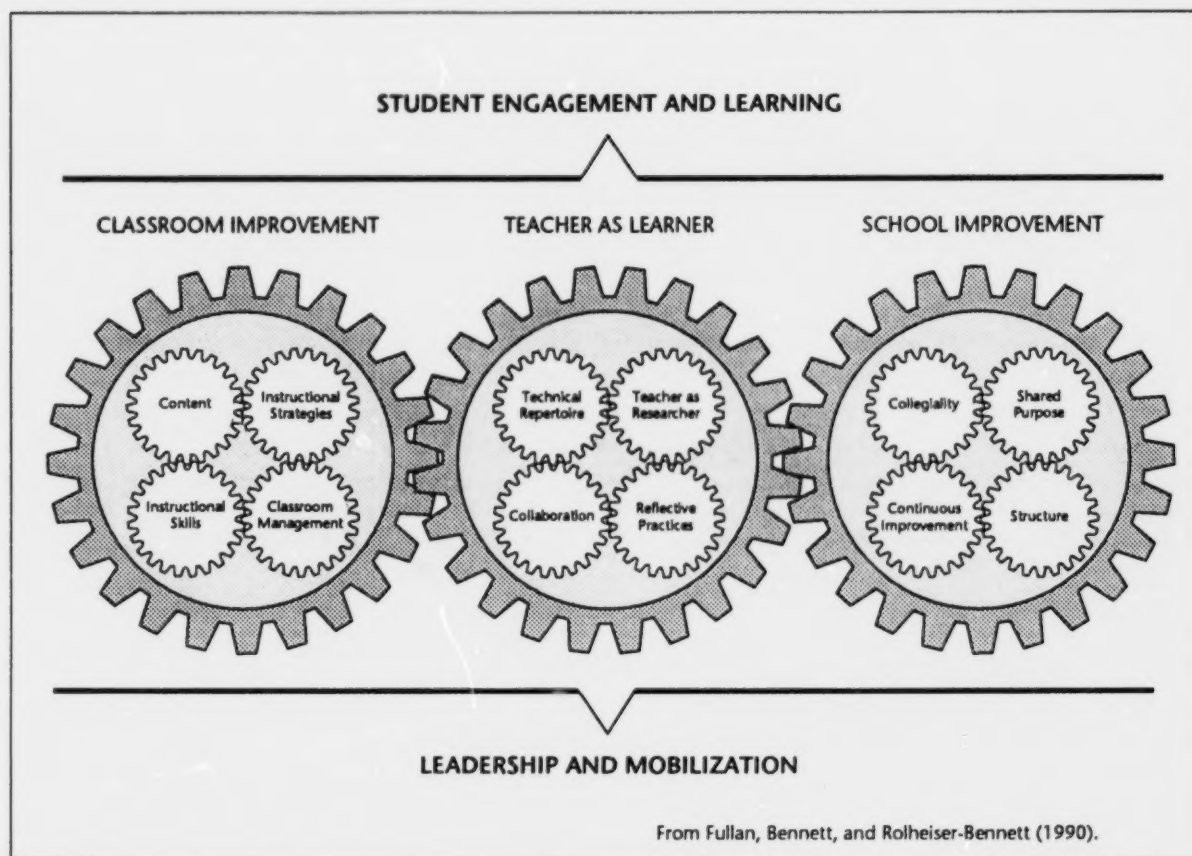


Figure 1 A Comprehensive Framework for Classroom and School Improvement

Why the Need for a Framework?

A great deal has been learned over the last three decades about classroom and school improvement. With that increase in learning comes a new complexity and a corresponding increase in demands on educators. And as most of us know, this is occurring in a profession that has little chance of becoming less demanding or less complex as we move toward the year 2000. Obviously, the responsibility to meet societal demands will continue in the future. Such demands will be placed heavily and observably with the teachers and administrators of all schools and school districts.

Certainly, though, just as the demands and complexity relating to education increase and change, there is a corresponding need for educators to respond more effectively and meaningfully. Yet, the

more experienced educators become, the more they begin to consider whether or not they can successfully integrate and implement everything that is known about classroom and school improvement. That dilemma invites the following questions: "How do reasonable educators respond when faced with increased demands and complexities?" and "How is it possible that reasonable people can restructure schools from within if they are overloaded, have isolated and narrow roles, do not understand the change process, and are not valued as life-long learners?"

The framework in Figure 1 helps us see the big picture. Attempting to restructure without understanding the design of what we are dealing with invites failure, or at best, sustains mediocrity. Although the surface organization of the framework

appears simple, the organizer is three-dimensional, integrative, and without a known end. The framework evolved from our own work with separate parts over a number of years, and we find it is still evolving. We believe this developmental structure can act as a guide for restructuring from within.

Explanation of the Framework

This section contains three parts: *Classroom Improvement*, *School Improvement*, and *Teacher as Learner*. Within each part a brief literature base is provided, which not only supports the ideas, but also provides a more detailed reference list related to the ideas presented. We have placed a greater emphasis on the classroom improvement part for the purpose of this chapter. The summary of this section integrates all three parts to help us reflect on the meaning and value of a collaborative school culture as the centerpiece of restructuring schools from within.

Classroom Improvement For classroom improvement, we and others (Strong, Silver, Hanson, Marzano, Wolfe, Dewing, and Brock 1990; Clemson and McTighe, 1990) have found that teachers work simultaneously (although not at the same level of skill) in a number of areas. In this section we focus on all four inner gears in the classroom improvement portion of Figure 1. The combined ability of teachers to integrate the following four areas is essential: (1) the focus on desired educational goals and content (which includes the teacher's knowledge about subject areas, child development, and individual learning styles); (2) managing the classroom (preventing or responding to student misbehavior); (3) instructional and thinking skills (specific teacher behaviors or student behaviors such as those found in Madeline Hunter's Mastery Learning program, and de Bono's CoRT program); and (4) the acquisition and integration of instructional strategies (complex processes of teaching that are usually theory driven—such as the Cooperative Learning, Concept Attainment, and Inquiry strategies described in Joyce and Weil's book, *Models of Teaching*, 1986).

Content refers to the information (facts, concepts, and principles, etc.) that makes up a knowledge base in a particular subject of study such as

math, French, history, or music. It also includes the supportive literature in areas such as child development and learning styles. Historically, curriculum referred to the materials such as slides, films, texts, and programs that facilitated the teaching and learning of a particular subject. Certainly, since the 1800s until the late 1970s, the design of curricula and purchasing of texts occupied the majority of time, money, and effort related to improving teaching and learning. Although rewriting curricula is part of restructuring, it is the easiest and least powerful approach to meaningful change (changes in teacher practices and beliefs being the most difficult and most powerful). If content is to be a useful partner in restructuring, it must be conceived in a more integrated manner.

In an encouraging vein, the current perspective on curriculum appears more integrative. On the surface, curriculum development now includes an integration of content and instructional processes—the what and how of teaching. Of course, some teachers and schools have been doing this for years. Nonetheless, it is becoming more of a norm, and as we look more deeply, we are beginning to find that integration occurs through a sensitivity to the personal experiences of the teachers and the students. That sensitivity is organized around a long-term relationship based on valuing the teachers' and students' past, present, and future. That valuing is a perspective providing a more responsible inclusion of equity education, which responds to issues such as gender and minority status.

Finally, we restructure so deeply that we support and work with educators who educate future educators. In teacher preparation programs we must encourage beliefs, model the process, and invite inquiry for the thoughtful embrace of a more integrative and globally responsible curriculum (see Joyce, 1986; Connelly and Clandinin, 1989; Goodlad, 1990).

Classroom Management has perplexed educators since the invention of classrooms. So, the timeless creativity of students to irritate teachers is not new, but when woven together with today's increasing complexity and demands of teaching, the challenge has not become easier. Effective teachers realize that regardless of how well they teach, or

how much students respect and like them, students will still misbehave. There are no easy answers to this component of teaching, even though there are a multitude of programs and books that feed educators' frenzied search for the panacea of classroom management problems. We don't believe a panacea exists; rather, we believe that classroom management is a reality in the ebb and flow of classroom activity. Effective educators accept and proactively respond to that reality.

Nearly every year the Gallup Poll reports discipline as the number one concern. Given the nature of our society, discipline problems are not likely to diminish unless we alter what happens in classrooms and schools. Susan Rosenholtz (1989) reports that thirty percent of first-year teachers in the United States do not return for the second year of teaching. A further twenty to thirty percent have left by the end of the fifth year. The reasons given relate to classroom management, isolation, and no sense of efficacy in teaching (instructional skills and strategies). Interestingly, both successful school staffs in the Louis and Miles research on urban high schools focused their initial efforts on classroom management and school-wide discipline.

In the framework, classroom management exists in two overlapping dimensions: preventing and responding to misbehavior. Prevention is most often a combination of the teacher's personality, the teacher's instructional repertoire, and the interpersonal climate within the school. If students are actively involved in meaningful and interesting learning that allows them to simultaneously be challenged and feel successful, then the chances of students misbehaving are decreased. Additionally, if students experience that challenge and success in a school where teachers are not only collegial but also collaborate on improving the learning environment in that school, the chance that misbehavior will be prevented is increased. If classrooms are not restructured to include meaningful, challenging, and active mental, physical, and spiritual involvement, then no discipline approach will prevent students from misbehaving, except for those approaches involving the restrictions of personal freedoms. The end result is that students are pushed out of school. We have never met a student who said she dropped

out of school because "I was just experiencing so much success...I was not bored or frustrated. I felt I belonged. The work I was doing was meaningful, interesting, and linked to my present and my future. For these reasons, I decided to drop out of school."

In more effective schools, appropriate learning environments are created by staffs working together, communicating with each other, and having a clearly articulated school policy related to dealing with inappropriate behavior (Purkey and Smith, 1985; Rosenholtz, 1989; Leithwood, 1990). Conversely, where isolation and little communication is the norm, the literature reports that teachers are more concerned about classroom management. In those schools, managing behavior becomes more time-consuming than involving the students in learning. It is not surprising that such situations result in the decline of student achievement.

The other dimension, responding to student behavior, involves a caring partnership among teachers, administrators, and parents. Teachers must have a repertoire of skills to respond to student misbehavior. Those skills must be appropriately applied from the moment students first misbehave to the time they move to power or mentally or physically hurt others. Further, teachers should be expected to employ the appropriate skills prior to having a student report to the office. Similarly, administrators must have a repertoire of skills to support teachers once a student has chosen to come to the office. If administrators know what the teacher did to prevent and respond to misbehavior prior to a student arriving at the office, then the administrator is more likely to effectively respond to the situation. Likewise, if parents are aware of what the teachers and administrators do in preventing and responding to student misbehavior, the school staff is in a better position to work effectively with the parents.

Importantly though, a staff must arrive at a consensus about preventing and responding to student misbehavior. Without a common philosophy it is easy for teachers to respond in ways that unintentionally increase the chances students will misbehave. Nonetheless, formulating a common purpose or belief statement is difficult if norms of

collegiality and collaboration between teachers are not part of the school culture. Reflecting on Figure 1, we could predict that if classroom and school improvement are considered in partnership, along with valuing teachers as learners, effective classroom management might occur in all classes, not only in the isolated few.

Instructional Skills are usually discrete, less complex teacher behaviors that encourage students to learn. Examples of skills are clearly stating or determining an objective and purpose for a lesson; providing a link to students' past experiences; asking questions that actively involve all students; and responding to students' incorrect responses in a way that encourages them to continue thinking. Such instructional skills assist in the dissemination, processing, and retention of information, as well as increase the likelihood students will be involved in meaningful learning and will transfer that learning. Most importantly, they assist the teacher in more effectively employing sophisticated strategies, such as cooperative small group learning and concept attainment, discussed in the next section.

Interestingly, few of the instructional skills discussed in the current literature are new. From an historical and developmental perspective, instructional skills were not invented by researchers, although researchers have assisted in their refinement. Rather, researchers have observed effective teachers in their classrooms and identified the behaviors of teachers who create effective learning environments. For example, Millar, who was the Deputy Minister of Education for the province of Ontario, Canada published a book in 1897 titled *School Management*. In that book he discusses directly or indirectly many of the instructional skills found in both Good and Brophy's book *Looking in Classrooms* (1987), and Madeline Hunter's *Mastery Teaching* book (1982). For example, Millar includes the skills of wait time, framing questions, and asking questions at different levels of complexity. He provides a clear and meaningful section on motivation that is as useful today as it was in the late 1800s.

The difference between Millar's understanding of instructional skills in the late 1800s and that of educators today is that we now have a more refined understanding of those skills and their role in in-

struction. The research also indicates that most instructional skills make positive differences in student learning (albeit not as large a difference as instructional strategies). For example, the research by Rowe (1974) and Tobin (1980) illustrates that increasing the wait time for students to think after being asked a question increases the complexity, length, and quality of a student's response.

Educators must appreciate that instructional skills are not designed to make big differences in student learning (see Sousa and Donovan, 1990). They are like instructional sandpaper, used to refine the process of instruction and learning. Most definitely, though, we have found that instructional skills are essential to the effective implementation of instructional strategies.

For example, Robert Slavin and David and Roger Johnson, researchers, writers, and trainers in cooperative learning strategies, report from their experience and research that clear and meaningful objectives or goals are essential if students are to experience success when working in groups. Given our own research and experience with cooperative learning, we agree that sharing in the understanding of what is being learned and why that learning is relevant is critical, regardless of whether the objective is determined by the teacher, the student, or negotiated by both student and teacher.

Continuing that example of clear and meaningful objectives, the literature reports that effective teachers have students spend more time in activities related to the learning objectives (Stallings and Kaskowitz, 1974). Fisher et al., (1980) found student attention and success rate improved when the teacher spent more time describing the goals of the lesson. In an ethnographic study of effective and ineffective classrooms (based on academic achievement) by Tikunoff, Berliner, and Rist (1975), they found that in less effective classrooms, students did not have a clue as to why they were involved in the lesson; why it was being taught; where the lesson fit relative to other things they had learned; and what they had to focus on to achieve success.

If we now link the research on instructional skills and classroom management skills relative to the framework in Figure 1, we start to appreciate the relationship between instruction and management

of behavior. In a study of eighty-seven secondary school classrooms, Stallings (1980) found considerable off-task behavior in classrooms where the teacher failed to clarify expectations and explain the rationale. Similarly, Carni's (1982) five-year study of seven children found that fragmentation and confusion were enemies of individual growth in learning activities. Again, going back to Figure 1, it is easy to predict the effect unclear and meaningless tasks have on student behavior. Therefore, teachers struggling with classroom management must consider how they are inviting students to be meaningfully involved in learning, as well as considering how their instructional skills and strategies support the student in being at the center of their experiences.

Further, if we integrate the classroom improvement and teacher as learner sections, we can appreciate what will happen if the school organization does not schedule time and opportunities for teachers to reflect on their experiences with the previously mentioned technical aspects of teaching, and to collaborate with their colleagues. If those things are not done, teachers will not make important connections between their content, skills, strategies, and classroom management. That lack of connection making likely results in negative effects on the program and instruction for students.

In summary, instructional skills and classroom management skills are critical in creating an environment that encourages thinking. If we reflect on building a house and ask, "Are the skills of hammering, sawing, and measuring essential to the carrying out of the ideas outlined in the blueprint (strategy) for building the house?" We would no doubt say, "Yes!" We could predict what a house would look like if a person attempted to follow the strategy of a blueprint even though they did not have the prerequisite building skills. The same holds true in teaching; if teachers do not have the prerequisite instructional skills, then they are unlikely to implement a more sophisticated strategy effectively. For example, in the Johnsons' approach to cooperative learning, the teacher is asked to integrate an academic and a collaborative objective. If teachers have difficulty formulating objectives or their students have difficulty identifying and clarifying objectives, or if the teacher is unable to

control the students, we can predict that the classroom will operate no more effectively than the house will be solid.

Instructional Strategies are more sophisticated sequences of teacher behaviors. Strategies, as conceptualized in this paper, have a coherent theoretical basis and provide theory-specific results. Their creators provide us with a rationale that explains the goals for which they were designed. When employed effectively, they help students increase their power as learners. For example, the framework in Figure 1 is an example of Ausubel's Advance Organizer; it helps make associations or connections and therefore assists memory and dialogue; Bruner's Concept Attainment and Taba's Concept Formation strategies assist in processing information inductively; Gordon's Syntectics strategy assists students in developing creative capacity, while the Johnsons' and Slavin's Cooperative Learning strategies and Oliver's Jurisprudential strategy help the learner to work with others to resolve problems and issues. (See Joyce and Weil, 1986, for a comprehensive introduction to a variety of strategies.)

Interestingly, the research reports that most teachers commonly employ only one instructional strategy—recitation. This strategy is a whole-class format characterized by question-answer drills over content. For the majority of teachers this represents the sole teaching method used. The omnipresence of this method is not new—as far back as 1945 Dale and Rath reported the prevalence of this teaching approach. In their study of 200 secondary school classrooms they surveyed teaching practices and found the recitation to be the most common method used. For most educators this is the traditional method of instruction, "the method they can so easily imitate from the many years of direct exposure as a student" (Rolheiser-Bennett, 1986, p. 9). Things have not changed much since 1945. Despite a steady increase in alternative ways to involve students in learning, as well as the need for those alternatives, teacher-centered instruction appears to remain as durable as ever (Goodlad, 1984; Doyle, 1986).

John Goodlad, in his book *A Place Called School*, provides one of the most extensive on-the-scene investigations of classrooms and schools ever un-

dertaken. Of his in-depth investigation of 1,016 classrooms he reports the following: "On the whole, teachers at all levels apparently did not know how to vary their instructional procedures, did not want to, or had some kind of difficulty doing so" (1984, p. 106). Of the same data, Sirotnik stated, "To put it succinctly, the modus operandi of the typical classroom is still didactics, practice, and little else" (1983, p. 17). Interestingly enough, divergence from the recitation and encouragement to expand instructional repertoires has frequently been advocated by educational researchers and practitioners. For example, Good and Brophy (1984) concluded that "...systematic use of a variety of techniques produces better results than heavy reliance on any one technique, even a good one" (p. 342).

The point to be made regarding this apparent pedagogical preference for relying on one technique (what we refer to as "monogogy") is that stand-up recitation is sufficient to achieve the learning outcomes included in our goals for education. Other alternatives exist that could be added to a teacher's repertoire, which are as effective, and often more effective, than stand-up-recitation. Yet, for whatever reason, they are not being utilized by all teachers (Joyce, Showers, & Rolheiser-Bennett, 1987).

We know that a number of additional instructional strategies or models of teaching exist (Joyce and Weil, 1986). Moreover, the research literature reports that many of those instructional strategies make large differences in student learning (Johnson and Johnson 1990, Rolheiser-Bennett, 1986, Slavin, 1988). The effect of instructional strategies on student learning is evident in the findings from programs such as Richmond County's staff development program in Augusta, Georgia (Joyce & Murphy 1990; Murphy & Sudderth, 1990). Certainly, the large positive effects on students' cognitive, personal, and social learning from the utilization of four alternative strategies (Cooperative Learning, Mnemonics, Synectics, and Advance Organizers) in Rolheiser-Bennett's study (1986) encourage us to go beyond our traditional boundaries, with the knowledge that practices exist that make meaningful differ-

ences in student learning. Indeed, the need to move beyond the trap of monogogy is a critical component of promoting thinking in our classrooms. It is a powerful key to restructuring classrooms and schools from within.

Obviously, then, another aspect of classroom improvement could be the addition of some of the researched-based instructional strategies to teachers' repertoires. Although mastery of those strategies is one small part of teaching, the appropriate use of those strategies would provide educators with alternative approaches in meeting student needs. More specifically and ethically, given that several hundred studies report Cooperative Small Group Learning produces meaningful differences in academic achievement, student attitudes, and self-concept, we can no longer naively accept the longstanding belief that one model can "do it all." Given the varied learning styles that students and teachers possess and the amount of information students must learn, it remains important that we provide the support and opportunity for teachers to acquire a variety of methods to create rich and varied learning environments.

Alternative Strategies How do teachers acquire alternate strategies? If the strategies are so effective why don't teachers add them to their instructional repertoire? We have found three reasons: a failure to understand the conditions under which teachers learn; a conflict between different philosophies or traditions; and curriculum fragility.

First, we have assumed that teachers could "pick up" alternative strategies by themselves and go about incorporating them into their classroom without the support of others. We do not wish to minimize the tremendous learning power of teachers. We believe that teachers learn through their own practice and experimentation; however, we also believe and have observed that that is not always enough when we are suggesting major instructional changes.

The research by Bennett (1987) illustrates that fewer than fifteen percent of teachers will effectively transfer learnings from a professional development experience to the classroom without follow-up support in the classroom. Why? The answer is complex. Let us begin with a perspective from when

teachers begin their career—at the preservice stage. In the Copeland (1975) study the university student teachers who demonstrated skill mastery were randomly placed with two groups of experienced classroom teachers during their practice teaching session. One group of teachers was trained in the same instructional skills as the student teachers, and was trained in how to provide feedback. The other group was not trained. In the environments where the experienced teachers were also trained, the student teachers easily transferred the training. In the environment where the experienced teachers were not trained, there was no evidence of transfer for the student teachers. When little or no collaboration exists between university or college personnel and the teachers in the schools where there are student teachers, the chance that the development of each others' ideas and practices are supported is decreased.

For teachers in the beginning and later stages of their career, the lack of transfer is connected to the climate or conditions in which they must learn. The multiple demands from students, parents, central office, trustees, the business community, the media, and society often occur in school climates where teachers are not valued as learners. In Barth's (1990) book, *Improving Schools From Within*, we get one glimpse of the climate within a school. He reports a graduate student's observations while at a respected suburban high school. The student found that the faculty were ill at ease and untrusting; that they felt compartmentalized, trapped, and forced to respond to increasing non-teaching demands. When teachers have to work in climates that do not encourage professional growth they are not likely to effectively learn. Hopkins' (1990) study found that most of the teachers at the end of training were not teaching in a way that reflected the ideas presented in the inservice course. The level of use of what teachers learned was influenced by the teacher's psychological state and the school's climate.

Another reason for lack of transfer is that teachers are busy professionals, with little extra time. Adding new models of teaching to one's repertoire involves increased time and effort to learn and plan. That leads us to ask: "Where are teachers go-

ing to get the time to learn, to experiment, to share, to reflect?" Certainly Sizer's book, *Horace's Compromise* (1984), illustrates the dilemma. Horace Smith is a proud, respected, and committed fifty-three year old, twenty-eight-year veteran English teacher—who finds that winning at school is a battle he is losing to "time." At best, Horace believes he is set, unwillingly, on a saddening compromise to produce mediocrity.

The issues of school collaboration, school climate, and enough time take us back to Figure 1 to focus on the school-improvement and teacher-as-learner areas. If the school staff does not make additions to the instructional repertoire part of its shared purpose, as well as building in structural changes (e.g., timetable changes) that facilitate the refinement and connection of present strategies, along with the learning of new strategies, there is little chance teachers will change.

A participant in one of our five-day Cooperative Learning Institutes (conducted during school time) approached us and stated, "I have worked for this district for sixteen years. Every day after school I must go home and meet my children coming home from school. My husband expects me to shop for groceries and to have supper ready. I am not complaining, but I can hardly sit after school at workshops without itching to get home and carry out what my family expects of me." She then kindly thanked us and said, "This is the first time I've really had a chance to learn with my friends at school; this is the first time I feel valued as a learner." The moral of the story is that we must better understand and employ the conditions under which teachers best remain life-long learners.

A second contributing factor to the transfer problem depends on whether teachers perceive new approaches to be in harmony with or in opposition to their current practice. In our experiences with a wide range of teachers we have found they often struggle to see how various strategies connect to and support or enrich one another. For example, to employ cooperative learning the teacher does not need to "throw out" stand-up recitation, nor does the teacher "throw out" whole language. On the contrary, cooperative learning adds another dimension to enrich both those approaches

to teaching and learning. Professional development consultants, school administrators, and others who work with teachers, have to create opportunities for teachers to make connections between innovations. Teachers need opportunities to create their own meaning around new practices.

The third factor influencing the acquisition of additional strategies is the problem of curriculum fragility and the teachers' attempts to not only apply one strategy, but to integrate a variety of strategies. Curriculum fragility refers primarily to secondary teachers who are caught in the pressure to cover a specific curriculum. The result is that teachers concentrate on the content of the curriculum rather than on connecting the instructional processes of teaching (e.g., role playing, discussions, debates, and cooperative learning) with what is to be learned. In the pressure to cover ground to meet the demands of external exams, teachers sometimes forget to take the students along with them. Spaulding (1970) completed a study investigating the student effects when instructional strategies were combined. The results were highly successful for the student—intellectually, socially, and personally (reported in Joyce and Weil, 1986). Although we believe combining strategies is powerful, no studies other than Spaulding's have been reported. We hypothesize that, as teachers more consistently add and integrate multiple strategies, we will see more meaningful gains in learning.

In summary, we argue that instructional strategies, when supported with content expertise, and relevant instructional and management skills, provide the teacher with a sense of instructional efficacy. That sense of efficacy encourages teachers to reflect on their practices, to collaborate with their colleagues, and to inquire into the practice of teaching and learning. The roadblock to that sense of efficacy relates to another one of the major gears in Figure 1, School Improvement, which includes the extent to which the school staff have a sense of purpose, are willing to establish norms of collegiality, and believe that continuous improvement is part of the natural development of the teacher.

School Improvement The literature on school improvement over the last seven years clearly informs

us that what goes on in schools makes a difference. The belief that all schools provide equal opportunities to learn is false. School environments differ in their ability to stimulate and encourage student and teacher learning. Those statements are supported by Rutter et al., in their book, *Fifteen Thousand Hours* (1979); by Mortimore et al., in their book, *School Matters* (1988); by Purkey and Smith in their article, "Effective Schools: A Review" (1985); by Rosenholtz in her book, *Teachers' Workplace: The Social Organization of Schools* (1989); and by Hopkins in his study reported in *Changing School Culture Through Staff Development* (1990).

Some of the characteristics reported in these studies are safe and orderly school climates, high expectations of student achievement, collaboration among staff, consensus on goals, leadership focused on curriculum and instruction, and frequent evaluation of student progress. From the perspective of school improvement, all of those characteristics can be affected by the actions of the teachers, administrators, and parents of each school.

As to school improvement, there is substantial evidence (Little, 1989; Rosenholtz, 1989) that schools improve when the school staff—not just one or two individuals—have, or come to have, a shared purpose ("how we do business around here"); norms of collegiality ("the extent to which we feel and believe we belong and are included"); norms of continuous improvement (the seeking of better practices); and structure (the organizational arrangements that press for movement in the other three areas). The following section elaborates on these four essential school improvement inner-cogs.

Shared Purpose refers to the degree to which the staff works toward understanding and creating common directions and common beliefs. That commonality assists them in making decisions related to student learning. It includes ideas like vision, mission, goals, objectives, and unity of purpose. A shared purpose helps the school staff have more control over the overwhelming number of innovations they are being asked to implement.

For example, let's say a staff's shared direction is the development of a cooperative, community-based school. That information would assist them

in searching for and selecting appropriate programs and materials. More specifically, they might initially choose to focus on the implementation of cooperative learning strategies to add to their instructional repertoires, rather than the Biological Inquiry or Concept Attainment strategies, because cooperative learning more appropriately meets their goal. Further, the idea of community would sensitize them to what the literature reports about collegiality and collaboration among teachers. Collegial support assists the implementation of an innovation such as cooperative learning. As a result, the staff might schedule in appropriate support time to allow teachers to get to know one another as colleagues. That time would likely allow teachers to feel comfortable collaborating in a peer-coaching or mentoring relationship.

A shared purpose provides an element of stability around the swirl of educational demands and competing forces. Teachers, parents, students, administrators, and politicians are part of the variety of interest groups that exist to ensure our goals will be multiple, shifting, and often disputed (Rosenholtz, 1989). In response, a shared purpose provides educators with a sense of knowing where they are going and of having control over how they are getting there. Perhaps even more essential, it provides educators with a vision upon which to reflect and a means to check whether or not the decisions being made are making a difference. The hallmark of successful organizations is a shared sense among its members about what they are trying to accomplish (Peters and Waterman, 1982).

Norms of Collegiality refer to the degree to which teachers interact to build levels of friendship and trust. Collegiality is an affective characteristic. It is a spirit of friendship. Collegiality helps teachers honor mutual sharing, assistance, and joint work. For example, in the work of Rolheiser-Bennett et al. (1991) with preservice and first-year teachers they found that building a sense of collegiality and community had a positive effect on the sense of comfort, trust, risk-taking, and willingness to collaborate in a variety of ways (e.g., reflection in base support groups, planning in school-based teams, classroom observation, and conferencing in peer coaching partnerships). Cer-

tainly, if a staff is to consider implementing an innovation such as peer coaching, then the presence of norms of collegiality affects whether that innovation can be effectively implemented.

It is not surprising that collegiality has a powerful effect on the climate of a school. Nonetheless, collegiality on its own does not necessarily guarantee a movement toward improvement. Teachers can be collegial in staff rooms and at parties and not provide an environment that encourages students to learn. Also, cliques within schools can be collegial; yet the overall effect on the staff is negative. For example, teachers who will only pair up with friends in a peer coaching relationship may not be contributing to a sense of collegiality school-wide. Collegiality on its own is not good enough; it must be attached to norms of continuous improvement.

Norms of Continuous Improvement refer to the beliefs and actions within the school that communicate the idea that teachers are perpetual learners. Like collegiality, norms of continuous improvement are also part of the school climate. Noteworthy, in Hopkins' study (1990) the following factors relating to school climate also reflected the idea that teachers continue to learn: a high degree of internal communication; the time and opportunity to observe and reflect on classroom practice; the expectation that everyone would contribute; the expectation that all teachers would take responsibility for implementing policies; and the support and involvement of administrators. From the students' perspective, Stelmaschuck's research (1986) reported that gifted students preferred to be taught by teachers who continued to learn themselves.

Structure includes the organizational arrangements, roles, and formal policies creating working conditions that support and press for movement in the other cogs. For example, structural changes include making scheduling changes to facilitate peer coaching, providing time for joint planning and teaching, creating new roles such as mentoring, designing procedures for staff development, locating funds, etc. Structure is critical in that it creates the time and allocates the resources that allow the teacher to be a learner. Again, structural changes

that are collaboratively established rather than imposed are more likely to be implemented in a school developing from an inside-out plan.

In conclusion, the school improvement gear in Figure 1 portrays that, unless teachers operate in an environment where they are developing vision and consensus; where they feel and believe they are important and included; and where the teacher as perpetual learner is encouraged through structural changes and support, then the idea of teacher as learner will remain just that—an idea.

Teacher as Learner From our perspective, the link between classroom and school improvement is created through valuing the teacher as learner. Among the learners, we include anybody at the school level who is a professional educator (for example, classroom teachers, vice-principals, principals, consultants, and so forth). The critical features of this aspect of the framework are the technical repertoire (this includes all four inner gears in the classroom improvement section); the reflective practices (the practices of thinking about and questioning the technical and personal aspects of teaching and learning); collaboration (the opportunity for teachers to discuss and interact with their colleagues in a variety of ways, including the giving and receiving of assistance and ideas); and the notion of the teacher as researcher (the fostering of inquiry and exploration).

The concept of technical repertoire was discussed in the section on classroom improvement. In this present section on the Teacher as Learner, we argue the need for teachers to continually learn from their own experiences and the experiences of others in developing a technical repertoire. Those experiences allow teachers to weave together ways to integrate a variety of skills and strategies more effectively in order to design environments that encourage students to learn. At the center of this idea, though, is the belief that the teacher and the student are both life-long learners.

The concept of the teacher as "Reflective Practitioner" goes beyond encouraging teachers to continue to add new ideas into their classroom environments. It "...engages the teacher in a cycle of thought and action based on professional experience. It generally portrays the teacher more as

creative artist/designer than as engineer/technician" (Wellington, 1991, p.4). Reflective practice honors the context of teachers. It is the context that enables the individual teacher to make the personal and professional transformations that bring teaching to a higher level of artistry.

We know that in most schools virtually no time is provided for teachers to make connections between their own ideas and the ideas of others. Further, little opportunity is provided for exploring ways in which reflective practice might be enhanced. Yet, there are many ways to facilitate teachers thinking about and coming to greater understanding of their own work. Chapter four in the book by Connelly and Clandinin, *Teachers as Curriculum Planners* (1989), illustrates a number of ways in which teachers can reflect on their practice (e.g., journal-writing, video and audio analysis of lessons). An entire issue of *Educational Leadership* (March, 1991) is devoted to exploring the concept of reflective practice, and to ways in which various educational institutions are fostering such practices.

A critical element in the literature on reflective practice is that teachers need time to reflect on what they are doing and why they are doing it. They also need opportunities to formulate ideas and goals that they see as important in their practice. We believe that inservices by staff developers or school board consultants that *tell* teachers what they should be doing, without respecting the past experiences and present situations of teachers, does little to encourage teachers to reflect and plan a more meaningful future. Such an approach also leads to a culture of teacher dependency, where no value is placed on the personal and practical knowledge of the teacher.

The concept of the teacher as collaborator nurtures reflective practice. Although providing time for individual reflection is important, teachers also need to interact with other colleagues in the school. They need this interaction for several reasons. First, teaching is not easy. Being isolated from one's colleagues and not having a forum to discuss successes, concerns, needs, and complexities does little to encourage teachers to learn. In fact, in Rosenholtz's study (1989), teacher isolation was one of the main reasons thirty percent of first-year

teachers in the United States did not return the second year—and why another twenty to thirty percent left teaching by the end of the fifth year. Other reasons for leaving cited by teachers were not knowing how they were doing, or having no sense of efficacy about their teaching. Obviously, if discussing teaching and learning is not a norm in the school, there is little encouragement for teachers to continue to learn.

Second, given the research evidence that students learn more when classes are structured in ways that promote interaction and interdependence, we might speculate that adult learners also learn more when they learn with and from one another. Such interaction encourages teachers to share learnings, explore differences, challenge ideas, articulate beliefs, and come to common understandings.

Third, collaboration increases transfer of training. For example, Bennett (1987) reports a meta-analysis investigating the amount of learning and transfer of learning after teachers had been involved in various types of teacher training. Figure 2 summarizes the findings.

From the results of the study we see that until teachers were provided the opportunity to practice and to provide feedback to each other in a safe situation, the amount of skill acquisition was minimal (ten percent of teachers). Yet, without the opportunity to interact with others back in the classroom, the transfer of learning acquired through practice and feedback was minimal (fifteen percent of teachers transferred). The results of this meta-analysis explains why school districts are encouraging and supporting programs such as peer coaching and mentoring (see Watson and Kilcher, 1990). Such programs illustrate two ways teachers can collaborate with other teachers, but many other ways exist.

Nonetheless, if we look at Figure 1 and the School Improvement section, we are reminded that, when a school administrator unilaterally decides to start a peer coaching or mentoring program we can predict the early demise of the initiative, if there are no norms of collegiality among staff members, or if the time to coach is not structured into the teachers' schedule (see Fullan and Hargreaves, 1991).

The concept of the teacher as researcher is closely connected to the concept of the teacher as reflective practitioner. The subtle difference is that

the notion of researcher supports teachers designing and carrying out investigations in their classrooms. Such investigations are commonly known as Action Research—that is, teachers tinkering with, and studying, the action in their own classrooms. Such an intellectual challenge celebrates the context of teaching, the personal development of knowledge, and the understanding that emerges. Hopkins (1985) describes it as "an act undertaken by teachers either to improve their own or a colleague's teaching or to test the assumption of educational theory in practice." We know every teacher tries new ideas to see if they work. They inquire into the practices of teaching and learning. The teacher-as-researcher concept emphasizes the importance of teachers developing their own questions, gathering information from their classes, drawing conclusions, and utilizing the information gleaned to guide future practice. By inquiring into their own practices, teachers develop a greater sense of efficacy and a greater sense of control over the demands and complexities of teaching. It is just as important that the inquiry findings are shared with other colleagues and that a forum for continued discussion is provided.

For example, a teacher may teach a two-week unit employing cooperative learning strategies and observe and record the effects on the students. Next, the teacher may teach another unit with the students working individually with little collaboration with other students and again observe and record the effects on the students. From that experience, the teacher will make decisions about the strengths and weaknesses of the two approaches with that group of students, and make future instructional decisions on the basis of the insights gleaned.

In summary, the notion of the teacher as learner sees the teacher as developer of technical repertoire, as reflective practitioner, as collaborator, and as researcher. The teacher is the bridge or link between classroom and school improvement. Without acknowledging the knowledge base within classroom and school improvement, no substance or vehicle supports the actions of teachers as learners.

The Case for a Collaborative School Culture
Reflecting on the framework, we are reminded of two final aspects that revolve around the singularly

	Skill	Transfer
Theory	10%	< 5%
Demonstration	10%	< 5%
Practice and Feedback	90%	15%
Follow-up support in classroom	> 90%	> 90%

Figure 2 Effects on Teacher Learning for Training Components

The percentage represents the number of teachers acquiring and transferring the skill.

important question: "What drives the framework?" One of the key driving factors we have identified (Fullan, Bennett, & Rolheiser-Bennett, 1990) is the presence and engagement of student learning as the goal on which the framework is predicated. In this model, student learning is at the center of classroom improvement, school improvement, and the switch to the teacher-as-learner philosophy. For example, in the school improvement area, the implication is that norms of continuous improvement relate to the design and implementation of environments that encourage student learning. Yet, even though the student is singularly important, without teacher collaboration little continuous improvement can occur.

The second driving force we have identified is leadership and mobilization. Here the argument is that leadership can, does, and must come from a variety of sources: principals, vice-principals, key teachers, parents, students, superintendents, consultants, trustees, governments, universities, and so on. If an innovation has a variety of leadership sources, then once the ideas in the framework are functioning, the simultaneous leadership from multiple sources is mobilized for long-term professional development. Again, the implication is that a more collaborative school culture and school system encourages all stakeholders to work together.

We believe that multiple leadership and mobilization is important because of the fragility of lasting change. It often takes three to five years to

make a difference and much less time to have it flit away. Most of us have experienced what happens to an innovation when a key person or source of funding is taken away.

Unfortunately, when classroom improvement is attempted without corresponding changes within the organization of the school (or vice versa) neither classrooms nor schools will improve. The reason has been obvious for years. The teacher makes the final decision as to whether or not an innovation will be implemented. That is why the teacher as learner is the bridge or centerpiece. If the teacher does not perceive that the innovation makes a difference in the classroom, the teacher will most likely discontinue its use. With complex innovations such as cooperative learning, teachers need much more up-front support as they implement the model (Fullan, Bennett, Rolheiser-Bennett, 1990). If we do not provide an environment that encourages experimentation and the opportunity to interact with colleagues; and if we do not provide teachers and administrators with the opportunity to be involved in a meaningful, thoughtful, and supportive staff development environment, neither classroom nor school improvement will occur.

It would seem then, that in order for learning to occur, a climate that encourages learning as well as critical dialogue concerning that learning is essential. We expect that an environment that fosters collaboration and that encourages and provides time for teachers to work cooperatively will produce the same type of attitudes and skills as when

students work cooperatively. Susan Rosenholtz, in her book *Teachers' Workplace* (1989) states:

And if teachers confronting thoughts of inadequacy recast the definition of work in terms of social relations with peers, protecting the status of those relations seems paramount. Thus offers of assistance to colleagues (who may also experience self-doubt) threaten one's professional standing by implying that the donor of advice is more competent than the recipient. Further, once the definition of work is recast in nonproductive terms, teachers who lay claim to classroom triumphs may suffer severe social censure from colleagues for appearing boastful and conceited Counterpointing this are achievement-oriented groups where pride in one's accomplishments is socially supported and encouraged by colleagues (p. 42-43)

That paragraph captures the essence of the metaphor of the cogs and gears in attempting to illustrate a framework for classroom and school improvement. In particular, it illustrates the importance of teachers as learners and the complexity and number of contextual forces they must understand. We know that the demands and complexities will increase. Teachers will be constantly in the middle of change even at the moment they are creating the outer edge.

KNOWLEDGE AS DESIGN: A Final Consideration for Restructuring

Historically, innovations in the area of instructional practices have not been implemented or integrated successfully, given the resources committed. Wave after wave of reform has left the deeper characteristics of schools and classrooms unchanged (Cuban, 1984). A number of reasons exist for that lack of success—reasons such as overload, teacher isolation, “group think” or faddism, limited resources, narrow role descriptions, and lack of rewards (Fullan and Hargreaves, 1991). If restructuring from the inside is to work, we must look at what we do in a new way.

In concluding this chapter on restructuring schools from within, we weave in David Perkins' (1986) idea of “Knowledge as Design.” Perkins argues the need for greater clarity and meaning

around educational concepts—when concepts are being learned, the learner should meaningfully respond to four questions related to that concept.

- What is the structure of the concept?
- What is the purpose of the concept?
- What are the model cases of the concept?
- What are the arguments supporting the concept?

Failure to address these questions leads to unsuccessful thinking on the part of the learner.

The issue of design plays itself out perfectly in how teachers learn concepts related to instruction. To illustrate the meaning of “knowledge as design,” as it applies to instruction, we explain one classroom practice through Perkins' lens of design. We will apply Perkins' ideas around “knowledge as design” to cooperative learning, one of the staff development concepts being implemented in our work with the Learning Consortium. Our rationale for selecting this area is that no other instructional concept has shown such promise for confusion as the current staff development practices around the implementation of cooperative learning. Our fear is that the essence of a powerful instructional strategy will be lost.

Most teachers are caught up in implementing what the market is encouraging them to implement, without the opportunity to critically understand the structure of cooperative learning (its theoretical constructs); to study its purpose (social basis); to see model cases (the many forms it can take); or to argue its value (which allows one to make fair-minded and reasonable decisions about how, where, and when to effectively implement cooperative learning). Specifically, few educators are connecting conceptual information about how groups function (as reported in the work of David and Roger Johnson [1989], Elizabeth Cohen [1986], and Dick Schmuck [1988]), with the ways in which they structure groups (as illustrated by Aronson's *Jigsaw* [1980]; Thelan's *Group Investigation* [1960]; Slavin's *Teams-Games-Tournaments* [1986]; and Kagan's *Inside/Outside Circles* [1990]).

We are finding that when teachers implement the cooperative structures without understanding the process of how groups function they do not as

effectively incorporate cooperative learning into their instructional repertoire. The failure to make the connections between the structures and process is primarily due to a failure to understand the design of the ideas being learned. And to some extent, that failure is the responsibility of researchers and staff developers who do not always celebrate, or make connections with, the efforts of others. One result is that educators may not be gaining the expected benefits of cooperative learning.

Educators' failure to integrate or make connections between the various instructional concepts is directly related to not valuing teachers enough to provide them with the time or opportunity to think critically about innovations. Currently, teachers are faced with an overwhelmingly unconnected smorgasbord of innovations related to instruction—a smorgasbord which teachers are encouraged to include in their instructional repertoire. Given the lack of sensitivity to teachers as learners, it is only reasonable that teachers have not made the linkages between the various instructional concepts.

That problem is involuntarily perpetuated by some researchers, administrators, and staff developers who lay that smorgasbord at the feet of teachers in an attempt to "market" ideas and materials, unfortunately at the expense of meaningful learning. Such an approach values neither how teachers learn nor the circumstances in which they learn.

Researchers, staff developers, and teachers need to understand and experience the connection between educational ideas. Learning is not about single, unconnected ideas, nor is research; yet we often act as if they were. The marketing of educational wares such as the results of research or curriculum materials, at the expense of fair-minded and reasonable critical thinking about those wares—which we might call *educational entrepreneurialitis*—is no longer acceptable.

CONCLUSION

In closing, the concept of restructuring is definitely being played out as we journey toward the year 2000. We are creating effective schools from the

context that imprisons them—but the players achieve only small pockets of success in school districts across North America. If the concept of restructuring is to progress beyond the unnoticeable, we must work consciously and caringly in three areas.

First, we must understand the design of the concept of restructuring: What are the critical characteristics of restructuring? What is the purpose of restructuring? What are some of the model cases of restructuring? and, What are the arguments that support the various approaches to restructuring schools? For us, the design of the concept of restructuring is already in place in those schools that are making a difference. We now must assist others to create more.

Second, we must understand and appreciate that what we currently know about the ways classrooms and schools improve must guide and support our decisions to restructure. We must understand the interactive relationship between classroom improvement, school improvement, and valuing teachers as learners. While some educators argue that restructuring means a total reconceptualizing of what we currently do, we must ask ourselves whether or not we would be successful given the fact that we were not able to implement and sustain past efforts at reforming education. Perhaps we are better off continuing to make a difference by bringing the average schools up to the level of those schools that successfully meet the needs of students; up to a level beyond the current need to rise above a synthetic average on a standardized test. Part of what we know is that restructuring is not a matter of single innovations, nor of multiple innovations within one school. Rather, it involves multiple innovations on multiple fronts—parents, the extended community, business, universities, and school districts working collaboratively as teachers and students move into and through the life-long continuum of teaching and learning.

Third, educators must be armed to think critically and creatively about the concept of educational change. Restructuring will be a journey about change, a change that deals directly with altering the cultures of schools through freeing the artists imprisoned within.

REFERENCES

- Aronson, E. (1980). Training teachers to use jigsaw learning: A manual for teachers. In S. Sharan, P. Hare, C.D. Webb, & R. Hertz-Lazarowitz (Eds.), *Cooperation in education*. Provo, UT: Brigham Young University Press.
- Barth, R. S. (1990). *Improving schools from within*. San Francisco: Jossey-Bass.
- Bennett, B. (1987). *The effectiveness of staff development training practices: A meta-analysis*. Unpublished doctoral Dissertation, University of Oregon, Eugene.
- Bosch, K. M. (1991). *Educational leadership: Three stories*. Paper presented at the Canadian Society for Studies in Education, Kingston, Ontario.
- Brandt, R. S. (Ed.) (1988). *Content of the curriculum*. ASCD Yearbook. Alexandria, VA: Association for Supervision and Curriculum Development.
- Caldwell B. J., & Spinks, J. M. (1988). *The self-managing school*. London, ON: Falmer Press.
- Carni, F. C. (1982). *The school lives of seven children: A five-year study*. Grand Forks ND: University of North Dakota Press.
- Clemson, R., & McTighe, J. (1990). Teaching teachers to make connections: A challenge for teacher educators. *Action in Teacher Education*, 12 (1), 55-60.
- Cohen, E. G. (1986). *Designing groupwork: Strategies for the heterogeneous classroom*. New York: Teachers College Press.
- Coker, H., Medly, D. M., & Soar, R. S. (1980). How valid are expert opinions about effective teaching? *Phi Delta Kappan*, 62, 131-134.
- Connelly, M. E., & Clandinin, D. J. (1989). *Teachers as curriculum planners: Narratives of experiences*. New York: Teachers College Press.
- Copeland, W. D. (1975). The relationship between microteaching and student-teacher classroom performance. *The Journal of Educational Research*, 68, 289-293.
- Cuban, L. (1984). *How teachers taught: Constancy and change in American classrooms: 1890-1990*. New York: Longman.
- Dale, E., & Raths, L. E. (1945). Discussion in the secondary school. *Education Research Bulletin*, 24, 1-6.
- de Bono, E. (1990). *The CoRT thinking program* (2nd ed.). Agincourt, Ontario: Dominie Press Limited.
- Doyle, W. H. (1986). Classroom organization and management. In M. C. Wittrock (Ed.), *Handbook on research on teaching*, (3rd ed). New York: Macmillan.
- Fisher, C. W., Berliner, D. C., Filby, N. N., Marlieve, R. S., Cahen, R. S., Dishaw, M. M. (1980). Teaching behaviors, academic learning time, and student achievement: An overview. In C. Denham & A. Lieberman (Eds.), *Time to learn*. Washington D. C.: U. S. Department of Education, National Institute of Education.
- Fullan, M., Bennett, B., & Rolheiser-Bennett C. (1990). Linking classroom and school improvement. *Educational Leadership*, 47(8), 13-19.
- Fullan, M., & Hargreaves, A. (1991). *What's worth fighting for in your school*. Toronto: Ontario Public School Teachers' Federation.
- Good, T. L., & Brophy, J. E. (1984). *Looking in classrooms*. New York: Harper & Row.
- Goodlad, J. (1990). *Teachers for our nation's schools*. San Francisco: Jossey-Bass.
- Goodlad, J. (1984). *A place called school*. New York: McGraw-Hill.
- Hopkins, D. (1990). Integrating staff development and school improvement: A study of teacher personality and school climate. In B. Joyce (Ed.), *Changing school culture through staff development: The 1990 ASCD Yearbook*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Hopkins, D. (1985). *A teacher's guide to classroom research*. New York: Open University Press.
- Hunter, M. (1982). *Mastery teaching*. El Segundo, CA: TIP Publications.
- Janson, H. W. (1991). *History of art: A survey of the major visual arts from the dawn of history to the present day*, (4th., ed.). New York: Prentice Hall.
- Johnson, D., & Johnson, R. (1990). *Cooperation and competition: Theory and research*. Edina, MN: Interaction Book Company.
- Johnson, D., & Johnson, R. (1989). *Cooperation and competition: Theory and research*. Edina, MA: Interaction Book Company.

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- Joyce, B., & Murphy, C. (1990). Epilogue: The curious complexities of cultural change. In B. Joyce (Ed.), *Changing school culture through staff development*. ASCD 1990 Yearbook. Alexandria, VA: Association for Supervision and Curriculum Development.
- Joyce, B., Murphy, C., Showers, B., & Murphy, J. (1989, November). School renewal as cultural change. *Educational Leadership*, pp. 70-77.
- Joyce, B., & Weil, M. (1986). *Models of teaching*. Englewood Cliffs: Prentice Hall.
- Joyce, B., Showers, B., & Rolheiser-Bennett, C. (1987). Staff development and student learning: A synthesis of research on models of teaching. *Educational Leadership*, 45 (2), 11-23.
- Kagan, S. (1990). *Cooperative learning resources for teachers*. San Juan Capistrano, CA: Resources for Teachers.
- Leithwood, K. A. (1990). The principal's role in teacher development. In B. Joyce, (Ed.), *Changing school culture through staff development*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Little, J. W. (1989). The persistence of privacy: Autonomy and initiative in teachers' professional relations. Paper presented at the annual meeting of the American Educational Research Association.
- Little, J. W. (1984). Norms of collegiality and experimentation: Workplace conditions of school success. *American Educational Research Journal*, 19, 325-40.
- Louis S. K., & Miles, M. B. (1990). *Improving the urban high school*. New York: Teachers College Press.
- Macrorie, K., (1984). *20 Teachers*. New York: Oxford University Press.
- Marzano, R. J., & Hutchins, C. L. (1985). *Thinking skills: A conceptual framework*. Kansas City, MO: Mid-continent Regional Educational Laboratory.
- Millar, J. (1897). *School management and the principles and practice of teaching*. Toronto: William Briggs.
- Mortimore, P., Sammons, P., Stoll, L., Lewis, D., & Ecob, R. (1988). *School matters: The junior years*. London: Open Books.
- Murphy, C., & Sudderth, C. (1990). *Three-year report on the models of teaching program*. Augusta, GA: Richmond County Board of Education.
- Neimark, J. (1985, June). Mind-Mapping. *Success*, pp. 52-56.
- Perkins, D. N. (1986). *Knowledge as design*. Hillsdale, NJ: Lawrence Erlbaum.
- Peters, T. J., & Waterman, R. H., Jr. (1982). *In search of excellence: Lessons from America's best-run companies*. New York: Harper & Row.
- Purkey, S. C., & Smith, M. S. (1985). Effective schools: A review. *Elementary School Journal*, 83(4), 427-452.
- Purkey, S. C., & Smith, M. S. (1985). School reform: The district policy implications of the effective schools literature. *Elementary School Journal*, 85(3), 353-389.
- Rolheiser-Bennett, C. (1986). *Four models of teaching: A meta-analysis of student outcomes*. Unpublished doctoral dissertation, University of Oregon, Eugene.
- Rolheiser-Bennett, C., Hundey, I., & Gooding, J. (1991). *Collegial support in a preservice program and induction program: Building norms for professional growth*. Paper presented at the annual meeting of the Canadian Society for Studies in Education, Kingston, ON.
- Rosenholtz, S. (1989). *Teachers' workplace: The social organization of schools*. New York: Longman.
- Rowe, M. (1974). Wait-time and rewards as instructional variables, their influence on language, logic, and fate control. *Journal of Research in Science Teaching*, 11, 81-94.
- Rutter, M., Maughn, B., Mortimore, P., & Ouston, J. (1979). *Fifteen thousand hours*. London: Open Books.
- Schmuck, R. A., & Schmuck, P. A. (1988). *Group processes in the classroom*. Dubuque, IA: W. C. Brown.
- Sirotnik, K. A. (1983). What you see is what you get—consistency, persistency, and mediocrity in classrooms. *Harvard Educational Review*, 53 (1), 16-31.
- Sizer, T. R. (1984). *Horace's compromise: The dilemma of the American high school*. Boston: Houghton Mifflin.
- Slavin, R. E. (1988). Cooperative learning and student achievement. *Educational Leadership*, 46(2), 31-33.
- Slavin, R. E. (1986). *Using student team learning* (3rd ed.). Baltimore, MD: The Johns Hopkins Team Learning Project.
- Sousa, D. A., & Donovan, J. F. (1990, April). Four-year study of the Hunter model shows student achievement gains in some areas. *The Developer*.
- Spaulding R. L. (1970). *Educational intervention program: Final report*. Durham, NC: Duke University.

- Stallings, J. A. (1980). Allocated academic learning time revisited, or beyond time on task. *Educational Researcher*, 8(11), 11-16.
- Stallings, J. A. (1976). How instructional processes relate to child outcomes in a National Study of Follow Through. *Journal of Teacher Education*, 27 (1), 43-47.
- Stallings, J., & Kaskowitz, D. (1974). *Follow through classroom observation evaluation, 1971-72. A study of implementation*. Menlo Park, CA: Stanford Research Institute.
- Stelmaschuck, M. (1986). *Identified and unidentified gifted: A comparative analysis*. Unpublished doctoral dissertation, University of Alberta, Edmonton.
- Strong, W. S. et al. (1990). Thoughtful education: Staff development for the 1990s. *Educational Leadership*, 47(5), 25-29.
- Thelan, H. (1960). *Education and the human quest*. New York: Harper and Row.
- Tikunoff, W. J., Berliner, D. C., and Rist, R. C. (1975). *An ethnographic study of the forty classrooms of the beginning teacher evaluation study known sample*. (Report No. 75-105). San Francisco: Far West Laboratory for Educational Research and Development.
- Tikunoff, W. J., & Ward, B. A. (1978). *A naturalistic study of the initiation of students into three-classroom social systems*. (Report No. A-78-11). San Francisco: Far West Laboratory.
- Tobin, K. (1980). The effect of an extended teacher wait-time on science achievement. *Journal of Research on Science Teaching*, 17, 469-475.
- Watson, N., & Kilcher, A. (1990). *Peer coaching: A review of the literature and a glimpse of Ontario practice*. A report prepared for the Ontario Secondary School Teachers' Federation.
- Wellington, B. (1991). The promise of reflective practice. *Educational Leadership*, 48(6), 4-5.

FROM TINKERING TO TRANSFORMATION

Robert M. McClure

Schools as we know them today were invented for another time, another place, another society, and a very different student body. The fundamental assumptions that guided practice in these schools had to do with the acquisition of a set of skills and attitudes about which there was broad agreement: the transmission of a body of knowledge that was seen as fairly immutable, and the sorting of students into groups that fit societal employment and leadership requirements. Schools were designed to fit the dominant operational metaphor of the assembly line: taking raw goods, moving them through a set of standardized procedures, and emerging with products that fit into variously preordained niches.

The call for fundamental and systemic change in schools is now the order of the day. This mandate exists because of an interrelated and complex set of phenomena—the development of new understandings about learning and human potential, the emergence of internationally based economic and information systems, the fruition of several civil rights movements, to name a few. Since the early 1980s, attempts have been made to improve schools to deal with these phenomena. Generally, these attempts have not addressed the fundamen-

tal aspects of schooling; they have been something akin to using aspirin for a serious illness.

This chapter focuses on thinking anew about the ways boys and girls should be educated, and how our current system can be used as a springboard for significant reform. The chapter begins with four stories¹ based on actual experiences in several schools. The stories suggest there is a good deal going on now that could spark needed changes. In the second part the emphasis is on those resources that can help schools move beyond the beginnings implied by the stories. The chapter concludes with a focus on the pedagogical future of schooling.

PRECURSORS TO TRANSFORMATION: FOUR STORIES

The stories that follow are based on the five-year experience of a school improvement effort, the NEA Mastery In Learning Project. The Project attempted to learn from twenty-six demographically representative schools the answers to a single question: "What happens when a community of teachers, scholars, and students are given the latitude, authority, and resources to develop a school that is appropriate for their unique community?"

In commenting about the Mastery In Learning Project, a researcher noted that it operated on an audacious assumption: teachers have minds! (Thompson, 1989) These four stories reveal the high quality of those minds at work.

Using a Socratic Crowbar When You Need It

In one group of schools, teachers are exploring new ways to ensure a snug fit between teaching methods and learning styles. Fifteen-year-old Jason, a student in this school, talks a great deal (some would say incessantly) and has a high level of energy.

Jason is not a problem student. During a spirited discussion of the Constitution, his teachers, Ms. Hillstone and Mr. Pettit, engage him in open-ended questioning, invite him to play the role of James Madison, and later ask him to produce an imagistic drawing suggesting the tension that dominated the debate at the Constitutional Convention. His homework for one week last spring was to read a volume of Thomas Jefferson's letters, then give the most convincing explanation of why this man, who wrote the Declaration of Independence, stayed in France while his colleagues drafted the Constitution.

The critical point is that with youngsters whose learning style tends toward the verbal and active, these teaching colleagues have learned to employ acting, poster making, role playing, guided imagery, open discussion, visualization, and a technique called "Socratic Crowbar." Students whose learning style tends toward the symbolic are placed in a different class where they treat the same course material through lecture, assigned readings, formal debates, recitations, and guided discussion.

Several teachers in Jason's school have worked together to get better clarity about how their students learn, and how they can create learning contexts appropriate for those styles.

Mary Hillstone and Jerry Pettit also understand, however, that information and knowledge does not always come to us in forms that match our unique learning styles; learning opportunities do not always conform to our idiosyncratic ways of knowing. For this reason, the faculty is also helping Jason and his peers learn a variety of ways to learn. The faculty

are defining the strengths and weaknesses of individual students, and providing direct instruction designed to increase the students' repertoire of learning skills.

What is important about this particular exemplar is that teachers in these schools are *acting together on what is known from research and practice* about brain functioning, learning, human growth and development, and how teaching connects to those bodies of knowledge. And, they are beginning where the student is, not where a textbook publisher or a state legislator or a bureaucrat deems that the student should be.

The Student Who Mistook Her Class for Meaning

Following the advice of Ernest Boyer (1983, p. 306-307), several schools have implemented a public service requirement for students, which carries a Carnegie unit required for graduation. These assignments allow students to contribute to their community *and* acquaint them with the reality of public policy issues.

In one school, public service requirements involve working through both public and private agencies with children, the elderly, and the disabled. Janice, who had always doubted she could help *anyone*, works in the Alzheimer's unit of a nursing home near her school. She makes a difference in the lives of the patients—and she knows it. The result? Exactly what the research predicts: Janice is now more self-confident and can no longer be numbered among the unmotivated. She knows she is needed in the world. Not surprisingly, Janice's grades in school have improved sharply. But more importantly, she has acquired a bit of wisdom that is hard to measure—and is of immeasurable worth.

Janice participates in her school's new program that requires a new role for teachers as mentors. In Janice's case, the experience in the nursing home is a success because she has a teacher guide to whom she turns for any kind of help, a person who watches out for her academically, socially, and personally. This mentoring plan at Janice's school involves more than students. Experienced teachers assume mentoring responsibilities for newer staff,

including education support personnel. The mentoring skills helping Janice to succeed were learned in a program designed by the faculty of the school.

The Power of Conniving

Two teachers in two schools in the Mastery In Learning Project sought leadership of their faculty's research committees on student grouping to *keep things as they were*. In both of these schools the students were grouped by ability tracks, and both of these teachers wanted it kept that way. As it turned out, the opposite occurred.

What produced that change was teachers assuming a new role, that of "researcher." Because of the power of the research on ability grouping and its negative effects on learning and socialization, both teachers changed their minds and became leaders in their faculties to remove tracking and to create practical strategies for teachers to work with heterogeneous groups of students.

In these schools intensive, faculty-led professional development has produced classrooms in which cooperative learning, cross-age grouping, grouping and regrouping for specific instructional purposes, and countless other strategies are employed so that students of different abilities can work together and learn from each other.

The Renaissance Then and Now

In *The Education of Henry Adams*, Adams discusses the worth of various kinds of knowledge and challenges his readers to determine what matters: "Nothing in education is so astonishing as the amount of ignorance it accumulates in the form of inert facts" (Adams, 1907). For the last story, the focus is on how an elementary school faculty has dealt with the eternal question, "What knowledge is of the most worth?"

Key School in Indianapolis is combining knowledge about multiple intelligences with an effective curriculum practice of the past called the "project approach."

In this school the curriculum is shaped by the theories of Howard Gardner (1983) and Mihaly Csikszentmihalyi (1990). This curriculum goes beyond the traditional emphasis on linguistic and

logical-mathematical abilities to incorporate other important human skills or intelligences: bodily-kinesthetic, musical talents, social analytic capabilities, and spatial skills.

At the Key School every student, every week, engages in activities related to the different intelligences that are being developed through this school's curriculum. For example, students might be engaged in a unit of work titled, "The Renaissance Then and Now." On one day a student might begin by working with puzzles and various games in a room set aside for such activities. Here, this student's ever-increasing skill with spatial relationships, eye/hand coordination, and inquiry into how things work are noted and aided by the teacher who is following a carefully planned, teacher-designed curriculum. All children in Key School will have such an experience during this week.

Later in the morning the student will work on the violin, becoming proficient in understanding how sound is made and what music is. Other times during this particular day, he or she will do art work, read, write, speak, engage in both arithmetic and mathematics, and work with others on group projects. The content of the unit relates to the European Renaissance of the fourteenth to seventeenth centuries *and* to the renewal presently taking place in her city.

One more aspect of this story concerns how this student's progress is assessed with regard to the seven intelligences. Each child has a portfolio representing the products of his or her learning over time. Because learning and its products are not two-dimensional, the children's portfolios differ from traditional folios used by artists. These collections of progress include videos begun with students in kindergarten. From this longitudinal look at representations of their work, teachers and parents know, for example, that the linguistic and bodily-kinesthetic skills of a particular student are progressing at a rapid pace, while the student's musical and spatial skills are progressing somewhat more slowly. In this school, this information is used to tailor a program appropriate for each student.

Work in Key School has been so successful that these ideas and practices will constitute the basis

for a junior and senior high school to be operative shortly.

SOURCES FOR SCHOOL TRANSFORMATION

Given the emphasis on decision making at the school level, few rules from the national staff guided participants in the Mastery In Learning work. One, however, permeated the projects in the various schools and is of particular importance to a discussion of how school change can be both fundamental and lasting. That rule was that *no decision could be made until all relevant options were examined and those options tested against the assumptions guiding the faculty's project.*

For example, at the outset of their school-improvement project, most faculties elected to work on school-wide discipline problems. In many schools the usual course of action would be to embrace a "package" created by an entrepreneurial developer—Lee Canter's Assertive Discipline Program, for example (Canter, 1979). In the schools associated with MIL, such an adoption was preceded by a search of the literature, an examination of research reports, an investigation of various professional development opportunities, and the like. Such an inquiry produced a variety of ways to approach school discipline. Each approach was compared with the faculty's definitions of what constituted ideal conditions of teaching, learning, curriculum, and school climate. If, for example, a faculty had established a goal calling for youngsters to be more independent in their behavior, more self-controlled, then a discipline program or package mandating that adults control the children would be inappropriate for that school.

As faculties engaged in inquiry of this kind, they realized their school was a system; it was important that one aspect of the operation support another. (We used the metaphor that school is like jello—if you touch it in one place, it jiggles in another. Later, a colleague, Beverly Johnson, created a more elegant metaphor: school is a delicately balanced mobile, and when one part is altered, the rest moves and changes. In effect, a new form is created.)

A description of the road these faculties traveled to become systemic, informed decision makers and to begin the renewal of their schools is treated elsewhere (Livingston & Castle, 1989; McClure, 1991). The balance of this section focuses on an important aspect of that journey: how teachers became empowered by relating to each other, to researchers, and to knowledge about school improvement.

The Horns of a Dilemma

The danger in relying on site-based decision making to reform education is that the substantive resources to which a faculty has access are limited. The culture of too many schools is dominated by behavioral objectives, standardized tests, textbooks, curriculum manuals, and bureaucratic norms. What can be counted is of more value than what counts; acquisition of the basic skills constitute the major student outcomes, while the more important skills used in living a productive life—inquiry into meaningful and important content, participatory citizenship, critical thinking, creativity, problem solving, effective and compelling forms of communication, and aesthetics—are often ignored. Content providing students with a liberal education that is truly liberating is too often not contained in the subject matter guides and textbooks that define the school's program.

Yet, the literature on change and organizational development strongly suggests that decisions made closest to the client are those that best serve the client. (Bentzen, 1974) If schools are to be improved in fundamental, lasting ways, this dilemma must be resolved. School people must find ways to lift themselves by their bootstraps to levels of excellence that reflect the best that is known about curriculum and learning.

The resolution that grew through the MIL work was to enlarge each school's access to research, ideas, visions, and to help each faculty acquire the skills and inclinations necessary to take advantage of such resources. At first, the vehicle was print—research findings and other materials selected and summarized into "Teaching Resources and Knowledge" packets. Prepared to respond to the improvement agendas established by network schools, these packets were mailed and faculties

then parceled them out to small work groups. Reporting often occurred in a "jigsaw" fashion. Later, with support from IBM, the Project created an electronic network linking the schools with one another, the MIL office, the regional educational laboratories, and several researchers.

This network has changed the ways in which participating faculties perceive professional knowledge, apply it, and create it. Following a few strands of conversation on the network illustrates these changes and the impact on teachers and teaching².

Teacher Voices

A third grade teacher in Appalachia asked a question one day:

Here is something I've been wondering. Sometimes a student seems to master a skill today only to later forget how to do the skill in a month or two... To counter this, I give review quizzes every once in a while to reinforce earlier-taught skills. How long should this reinforcement go on for each skill? All year? Should I concentrate on "crucial" skills? I know it depends on each class or individual, but I'd like to know generally. Is there any research on this?

Other elementary teachers responded with hints about following through and with reinforcement activities that had worked for them. A researcher then commented:

The dilemma is a common one for all of us, and I think it points out how dramatically we are foreshortening the teaching-learning process. That is, we aim our instruction, hit a target, check for some sort of impact, and move along to another issue. Although I have some problems with the so-called process-product research on teaching, one of the important findings of that work was the central place that a sequence of "presentation, practice, seatwork, homework, assessment" plays in skill development. The main issue is that as teachers we don't give enough time to PUBLIC practice, practice that isn't worksheets or problems in a book or some other private activity...

The researcher discussed teacher behaviors that support students' publicly demonstrating and prac-

ticing their skills. Soon, another researcher responded:

I'd like to latch on to the insightful comments on the need for public practice to give students ample opportunity to repeat the correct way of doing the skill until it is mastered. Public practice under the watchful and helpful minds of teammates is one of the major components of cooperative learning. You may have just put your finger on the most salient reason that cooperative learning improves student achievement and retention of learning.

A few weeks later, the teacher was back on-line:

I now plan out a time for skill-related activities that I semi-supervise (meaning that I listen to or watch the kids in these activities and notice which child dominates; which child has mastered the skill and now helps others to understand it; and which child answers incorrectly most often). I step in to help some students individually, but I usually don't get involved. Usually there are one or two students who have mastered the skill and help the others to practice correctly. If I hear a student teaching another incorrectly, I will step in and review the skill with both of them.

He then describes a wide variety of techniques and materials he is using and concludes with a question:

Are these some of the correct measures to go about planning for "public" practice?

These daily interchanges among practitioners and researchers are helping teachers to become more inquiring about their work, to see their problems as opportunities for inquiry, and to view knowledge about school improvement as an important tool for solving those problems. Teachers are also discovering their voices to talk about their schools and themselves in extraordinary (often metaphorical) ways. The following vignettes are taken from the network's conference on restructuring and the specific session on vision.

To me, a vision statement is more like a crowbar than apple pie. If it captures what you truly believe is most important for the development of the students, the vision can pry the lid off some stuff that could be going on (or not going on) in the interre-

lated bins of curriculum, instruction, school organization, staff attitudes and relationships, or parent/community involvement.

The faculties working together on this network are not unlike the pieces of a large stained glass window. The pieces are so varied—some with smooth edges, others jagged; some very transparent, others opaque; some in the middle of things, others only on the periphery... but all of equal importance to the overall picture, the overall structure. All the pieces are too close to the picture to appreciate its beauty or even to realize how their piece contributes to the whole design.

About John Goodlad's ideas—he talked about the needs of the child who is a third grader in size but working on a first grade level. He suggested we need two years of kindergarten rather than one. And that we should be asking, "Is first grade ready for this child?" not "Is this child ready for first grade?" The gist was that the grading structure of our schools does not fit our present circumstance.

National Public Radio just did a marvelous segment on Joe Raposo who has educated, entertained, and enlightened so many children via his songs on Sesame Street and other places. Joe, before his death of cancer at age 51, described how he got into music. He had a famous piano teacher who encouraged him to study music rather than law. He had no money so she invited him to live in her home. He said it was simply amazing to be the 21-year old kid at the table, eating with Stravinsky and Poulanc. And, he lived in the LAUNDRY ROOM. He could still remember the clothes hanging down. Seems to me that our school—perhaps the rest of you on this network, too—are eating with Stravinsky and Poulanc while living in the laundry room. There are lots of analogies to be drawn from this. But while I savor my own, you can relate to the image???

The school people participating in this network, along with those in all other schools, are constantly reacting to a number of expectations and demands. Shulman (1989) commented, "it is only the intelligent, moral, well-educated, and continually developing autonomous decision maker who can

broker effectively among those legitimate, albeit competing demands" (p. 502). The network has coupled the opportunity to have access to knowledge with the practitioner's thirst for reflective interaction. As Carol Livingston (1991) observes, "The autonomous decision maker cannot work in isolation As practitioners interact in a knowledge-rich environment, they reflect, question, learn, multiply knowledge, and increase their power to educate and change the institutions in which they work" (p. 3).

Empowered people connected to the best knowledge about teaching, learning, curriculum, and how to change and grow represent *the best resource available to us for creating the schools our students need and deserve.*

TOUCHSTONES FOR THE FUTURE

We must seriously engage our minds and imaginations to conceive a new institution that will serve today's youth. Such efforts will help those in schools shift their paradigm of education. Paradigms provide the personal construct through which people make sense of their world. They are touchstones to understanding complexity. In Joel Barker's videotape, *Into the Future: The Business of Paradigms*, he offers a proposition about how paradigms can influence change. He says that if a businessperson can answer one question about his or her organization, that person can predict the future of the business: *What is it that you cannot do today but that if you could do it, it would fundamentally change the nature of your work?* When teachers in the MIL Project encountered this question, they altered it to: *What is it that you cannot do today with and for your students but that if you could do it, it would fundamentally change the nature of your school and its potential to help students?* Most concluded the answer to the question was *to ensure that all students will learn.*

During the life of the MIL Project, many teachers and administrators concluded that the very structure of their school obstructed the reforms required to implement the answer to that question. The school was fundamentally unable to ensure

that all children will learn because of the ways teaching, learning, curriculum, indeed, the very system, were conceived.

As illustrated with the four stories (and countless others), much is taking place in our schools that can lead to a new institution. Teachers in renewal projects such as MIL have been about growing a new school, using the nutrients of what exists to move to a new, more student-serving institution.

A theorist about organizations, Terry Deal, writes, "...deep structures and practices cannot be reformed; they have to be transformed. To transform an organization is to alter its fundamental character or identity...transformation involves a collective renegotiation of historically anchored myths, metaphors, and meaning" (p. 9).

Four metaphors helped MIL schools move toward a more perfect paradigm for schooling. They relate to Teaching, Learning, and Curriculum—the TLC of the movement to transform schools.

First, these faculties tried to shift from *teaching as telling* to *teaching as coaching*. They cited Mr. Gradgrind in Charles Dickens' *Hard Times*, who was the quintessence of the open-the-head-and-fill-them-with-facts school of teaching. There are, they argued, few absolutes in the education business, but one of them now has to be that the Mr. Gradgrinds of the world must learn new skills. Teaching now requires the infinitely more complex pedagogical skills of guiding, challenging, questioning, directing, nurturing, inspiring, and helping students set high performance standards for themselves.

Teachers alone, of course, cannot (and should not) transform schools. Students must be central to the effort. A second paradigm shift must be to move from *passive learning* to *active learning*. In large measure, learning that matters comes through discovery, acting, and interacting with challenging content.

Third, MIL teachers are beginning to see curriculum in new ways: moving from *static curriculum* to *energetic curriculum, the fuel that drives the entire schooling enterprise*. If there is one critical flaw in today's schools, it is the trivialization of the American school curriculum. Because the curriculum is

so driven by standardized tests, youngsters are buried in layers of minutia of skills and discrete facts which do not add up to a decent liberal education. And yet, the real curriculum of ideas, art, science, and literature lie just outside the schoolhouse door waiting to be invited in.

The fourth paradigm has to do with the place called school, a place whose culture too often is not an alive, vibrant social institution. The fourth shift calls for *the culture of the school to move from lethargy and a peculiar kind of flatness, to a culture that is intellectually passionate*.

What does it mean for a school to be "intellectually passionate?" A part of the definition for MIL teachers came from Terry Deal, who suggests that, in large measure, the core problems of schools are more spiritual than technical (p. 12). For several years educational technicians have attempted to improve schools through technical approaches—programmed instruction, behavioral objectives, machine-scored tests, behavior-modification-like teaching strategies, state mandated accountability systems, and other such innovations. These costly efforts did not improve the quality of schools—some would say they worsened it.

Theologian Harvey Cox describes the world in which our schools exist:

We have pressed modern people so hard toward useful work and rational calculation, they have all but forgotten the joy of ecstatic celebration, antic play, and free imagination. Their shrunken psyches are as much a victim of industrialization as were the bent bodies of those luckless children who were once confined to English factories from dawn to dusk... [People], insofar as they are touched by the same debilitation, must learn again to dream and dance. (1969, p.12)

Those in schools need to remember how to "dream and dance," but in ways that bring new life to their institution (Deal, p.12). They have not had a chance to discuss the hard questions—"What's worth knowing?" "What can we do as a faculty to help these youngsters?" "How will we know we are doing what we should for these students?" These are tough questions; they have no easy answers.

Terry Deal writes; "new approaches to school will need to be shaped more by practitioners and parents than by policymakers. They will need to be guided by craft wisdom, instead of directed by objective knowledge produced by academics" (p. 12).

The resources parents and teachers bring to creating those new approaches; the intelligence, will, and passion they bring to the endeavor, will fundamentally change the ways young people are educated in the future.

END NOTES

1. Some of the material in these stories originally appeared in an unpublished speech, "The Coming Paradigm Shift in American Education," delivered by the author at the Chautauqua Institute, Chautauqua, NY, July 19, 1990. The first three stories are combinations of several case studies and names and places are disguised. The fourth story refers to an actual school.
2. Several teachers and researchers who participate in the NEA-IBM School Renewal Network contributed this dialogue during the 1989-90 and 1990-91 school years.

REFERENCES

- Adams, H. B. (1907). *The education of Henry Adams*. Washington, D.C.: Privately published (1918 edition, Boston & New York: Houghton-Mifflin).
- Barker, J. (1989). *Discovering the future: The business of paradigms*. [Videotape], Minneapolis: Chart House Learning Corporation.
- Bentzen, M. M. (1974). *Changing schools: The magic feather principle*. New York: McGraw-Hill.
- Boyer, E. L. (1983). *High school: A report on secondary education in America*. New York: Harper & Row.
- Canter, L. (1979). Taking charge of student behavior. *National Elementary Principal*, 58 (4), 33-36, 41.
- Cox, H. (1969). *The feast of fools*. Cambridge: Harvard University Press.
- Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. New York: Harper and Row.
- Deal, T. (1990). Reframing Reform. *Educational Leadership*, 47 (8), 6-12.
- Gardner, H. (1983). *Frames of mind*. New York: Basic Books.
- Livingston, C., & Castle, S. (1989). *Teachers and research in action*. Washington, D.C.: The National Education Association.
- Livingston, C. (1991, April). *Examining the evidence: Reflection and notation in network communication*. Paper presented at the annual meeting of the American Educational Research Association, Chicago.
- McClure, R. (1991). Individual growth and institutional renewal. In A. Lieberman and L. Miller (Eds.), *Staff development for education in the 90's*. (2nd ed., p. 221-241). New York: Teachers College Press.
- Shulman, L. (1989). Teaching alone, learning together: Needed agendas for the new reforms. In T.J. Sergiovanni & J.H. Moore (Eds.), *Schooling for tomorrow: Directing reforms to issues that count* (pp. 166-187). Boston: Allyn and Bacon.
- Thompson, C. L. (1989). Knowledge, power, professionalism, and human agency. In C. Livingston & S. Castle (Eds.), *Teachers and research in action* (p. 90-96), Washington, D.C.: National Education Association.

PRINCIPAL POWER: KEY TO SITE-BASED MANAGEMENT

Laurence W. Aronstein and Kenneth L. DeBenedictis

As school principals, our initial reaction to site-based management, when we first heard of it about five years ago, was that it would force us to relinquish the meager power we had. The school's operation would be turned over to a committee. Scrambling around for an appropriate metaphor, we thought back to a major league baseball team, the Chicago Cubs in the late 1960s, that had been run by a committee of coaches. Although the memory was foggy, the lesson was clear: the team finished dead last in its league and the experiment was abandoned at season's end.

Like many metaphors, ours tended toward inaccuracy and exaggeration. A committee of teachers running a school on a day-to-day basis is not what site-based management should be. In truth, the principal must be an active player and leader in an effectively restructured school.

SHARED DECISION MAKING

What do school principals do differently in site-based managed schools? In our research, and in our own experience, we have discovered that shared decision making is at the core of all success-

ful ventures into site-based school management. Effective leaders of such schools seem to do two things: they incorporate a shared problem-solving approach in their work and use their own group-work skills to facilitate the business that teams do. We are convinced that the school leader's effectiveness in applying problem-solving and group-work skills is the critical factor in making site-based management work.

Site-based management means empowering others; that is, providing an opportunity for others to make decisions and collaborating with them as they do so. It is an application of modern management practice that places decision making closer to the individuals who deliver services. It makes the classroom the real focus of responsibility.

GETTING STARTED

The movement to professionalize teaching has emerged, in part, from teachers' feelings of powerlessness over decisions affecting them and their students. The site-based management effort addresses these feelings by engaging teachers in making decisions about schoolwide policies that influence teaching and learning. In general, such

engagement means redefining the roles and responsibilities of teachers. It involves the shared ownership of what goes on in the school, and signals a movement from centralized control to diffused responsibility.

How does a principal begin the process of sharing power in the school? How can he or she encourage the collaboration that will enable teachers to break out of their traditional isolation? Our experience has demonstrated that school administrators must be comfortable in their roles and possess a fair amount of self-confidence before shared decision making can begin. An administrator who feels threatened, or who questions his or her level of authority, will probably hesitate to empower others.

Last summer, we were conducting a workshop on shared decision making for inner-city school administrators. We had carefully prepared our three-day effort by fine tuning some creative exercises that had succeeded in other workshops. But, in the second day of the workshop, something told us that we were in trouble. The principals were politely involved, but lacked the enthusiasm we usually experience. After trying unsuccessfully to add some extra "zing" to their interaction, we stopped the exercises and shared our observation that the workshop was falling rather flat. After a few self-conscious moments one participant announced: "How can you expect us to share our power when in fact we don't feel that we have any?" This is a rather telling statement: These school administrators were involved in a workshop for site-based management because, late that spring their superintendent had proclaimed that, in the fall, all schools would be site-based managed. The superintendent wanted a quick fix: but, with site-based management, such an approach simply cannot succeed.

Instead, administrators who want to share power must "work smart." They must build constituencies by encouraging teachers who already have some interest in restructuring to share readings or make site visits. They should encourage discussion about shared experiences to help develop themes that a site-based planning group can work with. They need to get feedback from colleagues with diverse

viewpoints, modify their own positions as needed, and begin to consider strategies for next steps.

Site-based management directly reflects the democratic process. Participants are nurtured and encouraged, their ideas are valued, and they share in the development of the emerging vision. We need to remind ourselves that school must not only be an exciting place for students, but a stimulating place for teachers as well. Site-based management demands a culture that values and even thrives on flexibility and change. However, it would be a disservice to throw members of the school community into a restructuring effort without providing necessary training and support. The work of site-based teams takes place mainly in groups, but most teachers have spent little time interacting with one another in problem-solving groups. Further, most teachers (and administrators) are not well versed in group dynamic skills and could benefit from training in this area.

By opening up an exchange of ideas and helping the site-based council to develop goals and actions, administrators can encourage a highly effective kind of cooperative learning for teachers. Such cooperation fosters a sense of belonging. Actively listening to teachers' ideas, following up on suggestions, and demonstrating that we can all "own" each decision can make site-based management a living reality, not just a distant corporate concept.

MAKING SITE-BASED MANAGEMENT WORK

Building A System of Governance

Governance is probably the first component that requires attention. True site-based management requires a collaborative legislative process, a set of rules for making rules. When teachers are making policy or designing procedures, they need to be clear about this legislative process. How will decisions be made? Will proposals be voted on or will we work towards consensus? In order that the best decisions are reached, the staff must be responsible and accountable legislators. If the site-based team makes a bad decision, the principal should not take the full blame.

Nonetheless, the process must encourage risk taking: new and different ideas need to be heard by all. And there must be a sense that, as participants, the staff has created a workable process to build and fulfill its vision.

How is the legislative process initiated? If the faculty generally supports site-based decision making, teachers and administrators must develop it. Group representatives (e.g., grade level teachers, special needs teachers, counselors, art and music teachers, computer and library specialists) need to come together and address some fundamental questions. These include: What problems need to be addressed? How are issues addressed? How are proposals developed? Is there an appeal process? Does the entire school decide issues or do representatives speak for their group? These and similar questions need to be answered early so that everyone clearly understands the rules in advance.

The principal must seriously rethink, and probably redefine, her or his role. Does the principal have veto power over site-based decisions? If so, do teams or the entire faculty have the power to override a veto? One thing is certain; before beginning a decision-making process, there must be an agreement on how decisions will be made.

Defining: Rules, Roles, Relationships

It is very important to understand that—as the thinking that leads to change evolves—every effective group goes through several stages in its work. From initial commitment to final agreement, groups grow developmentally in their roles, expectations and interactions. The planning group members who are responsible for making changes must recognize and evaluate the development of the group process and be prepared to make adjustments as needs arise.

Successful school administrators recognize that the school does not operate in isolation, but must consider the entire community in its actions. How do community groups get involved in site-based management? Careful two-way communications will help facilitate their inclusion. Parent support groups or PTOs should discuss their role in site-based management, and resources should be available to maintain their trust. Representatives

should be sought for membership in planning groups, and the roles of parents in such groups should be defined. As with any new direction, parents may need extra time for explanation and exploration, but, in the long run, parental support will pay dividends in broadening the scope of ideas. Clearly stated information, honestly presented, with diverse opportunities for input and feedback is essential for wide parent support.

Similarly, sharing ideas with the greater community can result in human, material, and fiscal support that goes beyond the regular school budget. The greater community wants to get involved in the schools, but doesn't always know what the schools need. The school administrator's job is to engage these groups, explaining proposals and inviting ideas. In some schools, partnerships have been organized so that community resources supplement school resources. In Westford, Massachusetts, representatives of Digital Equipment Corporation worked with school administrators during several evening sessions in strategically mapping out "where schools are" and "where we would like them to be." These sessions stimulated administrators' thinking about change and helped give them direction for their future work with staff. The Westford Partnership for Excellence in Education continues to be an active coalition of over one hundred representatives from area businesses that work directly with the schools in funding program requests, providing direct resources to students and teachers, and organizing work-related programs for students. Such efforts have enormous potential for additional community involvement and support; and the obvious direct beneficiaries are the students.

School sites are not autonomous government bodies, but are in fact one component of a larger organization. What is the role of central administration as it relates to the principal of a site-based managed school? Quite obviously, cooperative support from the central office is necessary. But site-based management doesn't happen overnight. The superintendent has to do more than proclaim that all schools are site-based and then go on to other agenda items. If the plan is initiated by the principal and staff, the central office needs to know

the goals early on. Support from the superintendent, even if tentative at first, is vital for such an initiative to proceed. The role of the central office, then, should be to ask the right questions; provide support for the staff effort through visible involvement and allocation of resources; and pave the road by preparing approaches to the school board that will help them better understand the initiative.

Throughout the process, the school administrator must remember that change to a site-based effort requires time. It is not an efficient method; central control is. But if the intent is to broaden the base of participation and provide clear opportunities for staff empowerment, and, most importantly, for staff ownership for school initiatives, then it has the potential to be the most successful method.

WHAT HAVE WE LEARNED AFTER FOUR YEARS?

Identify Reasons To Change

Our advice to school principals who are contemplating a move toward site-based management is: don't make changes unless you have good reasons. There are, for most of us, lots of good reasons, but the fact that site-based management is a popular movement should not be in and of itself the reason for change. If you and your faculty agree that fundamental modifications must take place in your school in order to improve teaching and learning, then that agreement might be a good place to start. Ken Olson, the founder and chief executive officer of Digital Equipment Corporation, has said that he worries most when things are going well for his company because there is no perceived force to make changes. He goes on to say that, if you are not moving ahead, then you are falling behind.

It is probably not coincidental that the first school systems that have embraced restructuring have been big cities (including Miami, New York, Boston, San Diego, Chicago). It is no secret that the conditions for teaching and learning in such cities, as perceived by the public, have been a national disgrace. The common feeling is that there is everything to gain and nothing to lose by moving

toward restructuring in these cities. But why would "successful schools"—where students are holding their own academically, students and teachers are safe, and the public is fairly satisfied—want to move toward restructuring? Critics ask: "If it ain't broke, why fix it?"

The assumption is that only things that are broken or flawed need improvement. But in most schools, even good ones, the culture of the school does need improvement and renewal. We contend that a healthy school has an ethos that says: "We are always striving toward improvement; there is always room for growth; change is good." If this value is accepted, it follows that when there is a demand for improvement, from any source, it is seen by faculty members as potentially positive, constructive, and healthy. We need not feel defensive and threatened. What Ken Olsen of Digital Equipment espouses is that change occurs best when things are going well and ideally should not be an outgrowth of conflict, crises, or discontent. Positive change is healthy growth and spurs us on to examine what we are doing now and how we might do it better.

Need for a Critical Mass

We know and accept that the teachers who make up our faculties represent a broad spectrum of attitudes, competencies, and capabilities. Some cope with and accept change much more easily than others. Our experience has been that roughly ten to twenty percent of our teachers are ready and open to make fundamental changes; another ten to twenty percent are nay-sayers. Therefore, the vast majority of our teachers fall well within the bell-shaped curve—that is where the nurturing needs to take place. A critical mass of active proponents for improvement must be in evidence for there to be any sustained and significant acceptance of organizational change. Again, our experience puts that critical mass at around thirty percent of a faculty. These are "the young Turks" who represent all ages and both sexes. These are the engines who have to pull along the entire train. These people think critically, question the status quo, work long and hard, practice the guiding principles of a democratic process, accept seeming ambiguity, and are willing learners.

Making Better Decisions

The real trick to site-based management, however, is not an ideological matter of empowerment or democracy, but is a question of making better decisions. If lots of time and energy are spent making shared decisions involving teachers, parents, students and others, and the process results in a poor decision, then the real intent is lost. If site-based management is really working, then the principal should be able to say: "The shared decision that has been made is a much better decision than I could ever have made by myself." This is the litmus test of site-based management.

As we indicated before, an individual decision maker, generally speaking, is a more efficient decision maker. But what singular decision making lacks is perspective. Groups of intelligent professionals will perceive more of the diverse implications of almost any issue. This will cause decision makers to spend more time examining the various implications and will require access to more sources of information. The result, therefore, will often yield a wiser decision.

The Real Test

Nevertheless, one important test comes when (and it will happen) the governing body makes a bad decision. Now, we know that individuals often make bad decisions. Generally, we forgive individuals, even the boss, for doing so. We remind ourselves that the boss is only human. We tell ourselves that hindsight is always twenty-twenty. But somehow shared decision making is held to a higher standard. Considering all the time and effort that went into the decision, we expect that "they" should make perfect decisions.

An important dilemma arises when the governing body makes a bad decision and the principal has to implement it. Often times, the principal, having an advantage of being a more experienced decision maker, might realize that it is a bad decision. But, if the principal doesn't carry out the actions of the governing body, he or she will be sabotaging the collaborative process and will be accused of being a bad loser, or even worse, being manipulative and controlling. If the principal goes along with implementing the decision, knowing

full well that it will fall and perhaps even hurt individuals or the school as a whole, is he or she being responsible and professional? Obviously, there is no easy answer.

Perhaps, the real answer lies, inherently, in the trust and respect within the school culture. The principal, acting as the faculty's conscientious adviser, should feel free to voice his or her true feelings and advice. Generally, a trusting faculty will take the principal's expression at face value, and defer to the voice of experience. The difficulty comes when issues become emotionally charged, individuals become positional and lose their objectivity, and actions and events are interpreted in terms of winning and losing. Often it comes down to how the principal expresses a viewpoint and not what is said.

If all are truly committed to site-based management, then in the short run, one or two poor decisions are probably tolerable. In fact, healthy conflict among members of the faculty can be productive. The importance of free and open expression, accomplished within a mutually respectful environment, should remain clear. The governance process really works when a faculty can come to its own realization that a bad decision has been made, and even after it is implemented, have the courage and conviction to admit its error and reverse its actions.

The Role of the Principal

In describing the role of the principal in site-based management, we often borrow a basketball metaphor. We think of the principal as the point guard. A good point guard dribbles the ball down the court, making sure to maintain a good view of the entire area of play. The point guard waits until the other players are in their best positions as they move in a coordinated way. The point guard usually passes the ball to the player who is in the best position to score. All the players are active and engaged, taking initiative and leadership. The point guard is the leader of leaders.

Now, what about the principal? Consider what the principal is not, in a site-based management system. The principal is not the final decision maker. We often hear principals espouse the

virtues of site-based management, only to add: "Of course, I have the final say; somebody has to be the ultimate decision maker; when it is all said and done I have to accept the responsibility for our decisions. That is not to say that the faculty doesn't have important input. However, I reserve veto power." Teachers often accept this line of reasoning without question. But how do we reconcile that notion that teachers are empowered with the existence of a principal's veto? Why should a faculty spend enormous time and effort—studying a problem, going through debate, and coming up with a proposal which they feel is in the best interests of the entire school community—only to have "the ultimate decision maker" veto the proposed action?

This dilemma lies at the very heart of shared decision making. Some schools allow for an override; others work toward a consensus. Still others vote on each proposal, with no veto power for the principal. In any case, determining the role for the principal in decision making is a critical factor in defining the overall role.

If the principal has veto power, it might be interpreted that he or she represents an administrative branch of the governance system. If so, one might conclude that the principal need not play an active role in the debate. His or her role is played out within the context of "power politics" in which the potential for a veto represents an important influence. Principals must think through what role they want to play well in advance. Do they want to be active players, flattening the hierarchy between administrators and teachers, taking a vital part in a free and open debate, or do they feel more comfortable standing above the debate, as they take and articulate a position? The choice is a difficult one.

Involvement of the Greater Community: Some Examples

As we discussed earlier in the chapter, parents play a vital role in site-based management. Interestingly, their involvement varies from place to place. In Chicago, parents, teachers, and administrators are all members of the site team. Each member has one vote. Elected parent representatives make up the majority of the site team. In Rochester, New York,

there is a similar composition; however, the teachers' contract calls for teachers to be in the majority on each site team. Another model sets up a dual, two-tier system. Parents are represented on a legislative committee of the parents' association. Teachers serve on a separate faculty council. Parent proposals are presented as recommendations to the faculty council, which in turn can either accept, reject, or modify the parent proposals. The logic behind this two-tier model rests on three contentions:

1. That teachers have a greater knowledge base regarding school matters by nature of their education and experience;
2. That teachers generally have a long-term commitment to a school and its plans, whereas a middle school or high school parent might have only a three- or four-year commitment to the school; and
3. That parents and teachers might not speak freely within the same forum for fear of offending one another and the retaliation that might result. Such mistrust might be lamentable, but it should be carefully considered.

Regardless of the option chosen for parent participation, some difficult and sensitive questions need to be answered. What information should be shared with parents and to what extent? What is the principal's role in sharing information with parents, bearing in mind that some of this information might put the faculty, the central office administration, or the school board in a bad light? Where does the principal's loyalty lie? Does the principal serve as an advisor to the parents?

We suggest that the principal address all of these critical questions with faculty members and parents at the very onset of site-based planning, so that all parties are fully aware of the critically important decisions that will be made.

Site-based management has enormous potential for impacting the way professionals work together in the school. It offers an exciting opportunity to directly involve those who provide for children, and could result in the collective ownership of the services that encourage pupil growth.

REFERENCES

- Aronstein, L. W., & DeBenedictis, K. L. (1991). An interactive workshop: Encouraging school-based management. *NASSP Bulletin*, 75(537), 67-72.
- Aronstein, L. W., & DeBenedictis, K. L. (1989). What do skillful administrators do when creating curriculum change? *Illinois School Research and Development*, 25(2), 60-66.
- Aronstein, L. W., & DeBenedictis, K. L. (1987). *The principal as a leader of curriculum change: A study of exemplary school administrators*. Quincy, MA: Massachusetts Department of Education.
- Aronstein, L. W., Marlow, M., & Desilets, B. (1990). Detours on the road to site-based management. *Educational Leadership*, 47(7), 61-63.
- Conley, S., & Bacharach, S. (1990). From school-site management to participating school-site management. *Phi Delta Kappan*, 71(5) 539-544.
- Fiske, E. B. (1991). *Smart schools, smart kids*, New York: Simon and Schuster.
- Lieberman, A. (1988). Expanding the leadership team. *Educational Leadership*, 46(5) 4-8.
- O'Neil, J. (1990). Piecing together the restructuring puzzle. *Educational Leadership*, 47(7) 4-10.
- Payzant, T. (1989). To restructure schools, we've changed the way the bureaucracy works. *The American School Board Journal*, 176(10) 19-22.
- Sizer, T. R. (1991). No pain, no gain. *Educational Leadership*, 48(6), 32-34.
- Timar, T. (1989). The politics of school restructuring. *Phi Delta Kappan*, 70(4) 265-275.

ADULTS FROM THE INSIDE OUT

Judy-Arin Krupp

“**M**an’s mind, stretched to a new idea, never goes back to its original dimension.” In writing these words, Oliver Wendell Holmes demonstrated his understanding of the impact of progression through life’s hierarchical stages. Each stage brings with it a new world view, a new paradigm, or a more complete understanding of variables affecting reality. Educators who want to restructure schools and effect lasting change need to understand the reality view of adults with whom they work. For, as the anonymous saying goes, “we do not see the world as it is, but as we are.”

This chapter presents two hierarchical views of adult cognitive development and the practical relevance of each for restructuring schools from the inside out.

BASIC CONCEPTS

Three concepts create the foundation for hierarchical stage theorists. They include an invariant

sequence of stages, the dialectic needed for growth, and the judgment that higher means better.

Invariance

An invariant sequence of stages comprises hierarchical models (Kohlberg, 1984; Walker, 1989).¹ A person must go through stage one before stage two, stage two before stage three and so forth. An individual can only understand that which he or she has faced and resolved. One’s perspective of the world and view of self in relation to that world remain limited by the stages achieved.

People react to life events based on the meaning each person has constructed or the stage the individual has reached both for that event and for the self in relation to that occurrence. Each individual constructs his or her own reality, and that verity is the only truth possible for that person at that time. The person is embedded in today’s reality and cannot study the present sense of self, but automatically projects the current connotation of self, his or her prevailing truth, onto the world. In fact,

one's reality view coordinates and mediates the world for the person (Kegan, 1982).

Dialectic

Imperceptibly one's current connotation of self starts to seem incomplete. The individual begins to feel uncomfortable with the truce or balance between the present truth and experiences or objects in life. Slowly the person modifies his or her reality and a new balance between self and world seems comfortable. The individual has entered another stage.

During this dialectical process any specific point in time reflects a reality view that allows an individual to perceive the old and the new in a novel synthesis. The amalgam of an aged conceptualization with an innovative idea or a slowly developing or sudden insight synthesizes both ideas into a new thesis. This new thesis becomes the foundation for a new dialectic, duality, or stage. Daloz (1986, 142) says that "truth is where the disputants choose to take a break" in the dialectical process of beginning with a thesis, countering it with a contradictory statement emerging from growth and new insights, and then synthesizing both to create a new thesis as the base of a new dialectic. Daloz (1986) and Basseches (1985) call this process dialectical thinking and suggest it leads to a transformation in our understanding and, therefore, in our reality view, stage of cognitive development, and placement on other hierarchical adult developmental models.

Dialectical thinking accounts for staff's beliefs about educational issues. Individuals who have experienced annual changes in schools may consider modifications simply fly-by-night innovations that won't last. Bit-by-bit, as employees experience lasting change producing growth in themselves and students, they will call the negative view of restructuring into question. A new realization about the growth and excitement emanating from change will gradually emerge. When the individual can study the old belief in light of the new conceptualizations, then a fresh thesis can emerge. The person might state the novel synthesis as "I've got to give new ideas a chance because they do lead to

growth." This becomes a new truth that the employee projects onto his or her world. This new thesis now becomes the starting point for a new dialectic. As teachers experience more and more programs that result in personal growth, changes in the classroom, and higher student achievement, they will study the thesis ("I've got to give change a chance because it does lead to growth") in relation to the new insights and experiences. Again, a new dialectic emerges. This fresh dialectic leads to a new synthesis such as "restructuring offers the potential for growth in all aspects of education." Once more the person projects a new reality onto his or her world. This process repeats itself ad infinitum in growing individuals.

Higher/Better

The higher stages do not necessarily bring greater happiness. In the sense that people at the top stages encompass more of the world in their view of reality, they have a better ability to make decisions. As a result, hierarchical models have a value orientation: The higher the stage the better in terms of ability to identify, consider, and integrate more variables before acting.

As the self changes, the person's beliefs about all aspects of education modify. Research corroborates the greater complexity of those at the top of the hierarchical models (Bents and Bents, 1990). Teachers at the higher stages of development demonstrate more flexibility, toleration for stress, adaptability, and complexity as well as the capacity to take multiple perspectives, use a variety of coping behaviors, and have a broader repertoire of teaching models (Hunt, 1977-78; Joyce & Weil, 1980; McNergney & Carrier, 1981; Oja, 1990; Sprintall & Thies-Sprintall, 1983). Those at the top of the hierarchical models match the prototype for an expert master teacher (Bents & Bents, 1990).

Restructuring must, therefore, start from the inside out. Educational institutions cannot continue to hire workers in a contract where workers agree to remain the same as when they were hired, but must recognize the obligation of the workplace to establish a climate for continued evolution (Kegan, 1982). A growth-oriented climate has an employee

assistance program; offers career planning, growth-oriented discussion groups, and support; and encourages exploration of possibilities. Evolving personnel do not fear restructuring. They perceive modification as the essence of an exciting life. The higher the stage to which the worker evolves, the better that person's ability to view the discrepant and diverse variables affecting education, curriculum, students, and self. Individuals at higher stages are also more willing to live a life of growth and modification.

TWO KEY CAVEATS

First, persons classified at a specific stage demonstrate many, but not all, of the characteristics of that state. No individual fits any stage exactly. Some employees exhibit transitional behaviors as they leave one stage and move on to the next. Others appear to inhabit more than one stage. Readers must steer clear of the danger of pigeonholing people.

Second, these hierarchical models do not exist in a vacuum. How a specific individual translates the characteristics of a given stage into action relates to many other variables. One could develop a laundry list of parameters that have an effect on action. The list might include the person's level of conceptual complexity, learning style, cohort group, the historical moment of one's life, available support, roles and relationships, physical needs, job security, self-esteem, religious or ethnic affiliation, and geographic location and norms. Determination of a person's locus on one of the models depends not on the evident action, but on the motivation for the behavior. This cannot receive enough emphasis.

COGNITIVE DEVELOPMENT

Perry (1968) researched the cognitive development of 112 Harvard men and 28 Radcliffe women. He studied the "forms," the ways of seeing, knowing, and caring, through which learners interpret new content, their experience, and their lives. After lengthy discussion the judges decided to report on the male narratives because the only evident male-

female differences emerged in the "content and manner of the students' reports" (Perry, 1968, 16) rather than in the developmental blueprint.

Belenky et al. (1986) concede that Perry's work effectively identifies what women have in common with men. They argue, however, that his work does not ferret out themes dominating women's cognitive development. Belenky et al. interviewed 135 women and described the "epistemological perspectives" these females use to understand their world. They do not claim stage-like characteristics for their perspectives since their data do not address the rationale for changes in position. The epistemological perspectives tend to fit a parallel and interactive model rather than a developmental one (Dunlap, 1989), and yet the higher positions do encompass more variables in decision making. Dunlap found both men and women utilize the perspectives delineated in *Women's Ways of Knowing*. Individuals employ more than one viewpoint depending on the perspective or forms reached, the type of problem, and the time available to reach a solution (Dunlap, 1989; Perry, 1968).

Perry's Paradigm

Nine stages or positions characterize this hierarchical model of intellectual and ethical development. They include three stages of dualism (1 = basic duality; 2 = multiplicity pre-legitimate; 3 = multiplicity subordinate), three of relativistic, contextual, and multiplistic thought (4 = multiplicity correlate or relativism subordinate; 5 = relativism correlate; 6 = commitment foreseen), and three of stabilization and commitment within relativism (7 = initial commitment; 8 = orientation in implications of commitment; 9 = developing commitments).

Dualistic people project two polarities on the world: *we/right/good* and *others/wrong/bad*. The world appears black or white. One errs when not following the "right" or "good" path. These learners rely on authorities who know the "truth." To improve at a task one simply must work hard, obey, and follow the "right" approach. Uncertainty stems from poorly qualified leaders who lack knowledge of the "truth," from teachers who use indecisive queries as an exercise to make learners find "the

answer," or from the fact that experts haven't yet found the answers.

Individuals at relativistic, contextual, and multiplicitic stages start out holding onto both dualistic thinking and dependency on external authorities. They believe either that "truth" does exist and the authority uses ambiguity as a challenge to get the learner to grow or that uncertainty will always exist in the areas where teachers have not discovered an absolute "truth." In these uncharted arenas anything goes. Gradually learners perceive all learning, all truth, and all life as relativistic. The learner understands knowledge as a nonfixed construction appropriate to a given context. Students relegate dualistic right/wrong thinking to the category of a special case in a relativistically structured world. They feel all opinions and ideas deserve respect, including their own. The opinion of the authority represents just one of many. If "anything goes" then identity may disappear—a frightening thought. Learners begin to wonder how they can maintain their identity in a relativistic world. The answer lies in commitment. By the end of stage six of Perry's scale, "commitment is foreseen as the resolution of the problems of relativism, but it has not yet been experienced" (Perry, 1968, 137).

Stabilization and an initial commitment to a definition of self herald arrival at the last three stages. The person feels relief because he or she says, "I'm going to teach," yet the identity feels tentative at first. Gradually the person experiences the responsibilities inherent in the commitment. Questions surface. A teacher may wonder how much time to give to do the job effectively. An administrator may query the viability of education as a lifelong career focus. Finally, the learners realize that maintaining an identity across the lifespan requires an ongoing series of decisions and resolutions. The chain of commitments becomes each individual's life structure.

Not all learners advance through these stages. Some people temporize. These individuals remain in the same position. They hesitate to take the next step. Others escape into the safety of stages four and five where one need not assume responsibility for self. Still others retreat to the safety of the dualistic, absolute positions of the early stages.

Women's Ways of Knowing: Epistemologic Perspectives

Belenky et al. (1986) identified five epistemologic categories for women's perspectives on knowing:

Category One: Silence. These women perceive themselves as mindless and voiceless. The ideas and impulses of others control them. They represent an extreme of both self-denial and dependence on external authorities for regulation. These women describe themselves as deaf and dumb. Deaf because they do not learn from the words of others, but act only when others show them what to do. Dumb because they feel voiceless. Their inability to utilize the tools (words) for representing their experiences isolates them and limits their ways of knowing and learning to the realm of the actual, concrete, present, and observable. Polarities dominate for these women. Because of this dualism they conclude that if someone wins another person loses. These women see themselves as set up to lose, therefore they speak the words of others and act in consort with what others show them they should do. Only when the others win will the verbal and physical battle against them cease.

Category Two: Received Knowledge—Listening to the Voices of Others. Women in this epistemological category take learning and their sense of self from the all-knowing authorities and reiterate and reproduce that information. They lack confidence in their ability to create knowledge from their experience or express an opinion. These women believe authorities get truth from even higher authorities. Therefore, when different leaders present conflicting ideas, these women go with the higher authority, because higher or bigger means better. These listening women—like dualistic men—both stand in awe of their teachers, but the women do not identify with the leaders as do the men. Yet these women unknowingly shape their thoughts, perceptions, and experiences to match those of their friends and authorities. They conform. Then these receivers of knowledge delight in the commonalities they share with others.

In a learning situation, listening women appreciate questions with clear answers, literal interpretations, and predictability. They like leaders who delineate requirements, give clear directions, and

sequence information. Receivers of knowledge either get the idea or don't. They make no attempt to truly understand the conceptualizations as long as they have the facts and can reiterate them. Once they have the facts then they can act on the "shoulds" and "oughts." By so doing they gain affirmation for their concept of truth. These receivers of knowledge have difficulty absorbing information that conflicts with knowledge learned in the past.

Category Three: Subjective Knowledge—The Inner Voice and the Quest for Self. Almost half the women Belenky et al. studied fit in this category. Truth emerges from that which feels right rather than from a rational or logical progress. Subjective knowers continue to believe in right answers, but seek those responses from themselves rather than from others. They listen to their "infallible gut," believing that each person comes to his or her own truth and no one has the right to impose his or her perception on another. They become their own authorities, committing deeply to their views and either publicly or privately negating contrasting conceptualizations. Their concept of who they are and how they need support changes as their self-concept develops. They feel ill at ease with their fluctuating sense of self, constantly modifying perceptualizations, and the valuing of feelings over thinking (Bingman et al., 1990). The future seems wrapped in haze. At the same time this hesitancy, undecidedness, risk taking, and change brings exhilaration and a sense of growth. Women with a personal sense of knowledge see the world from multiple perspectives.

As learners, they watch and listen. Observing and hearing themselves results in identification of inner conflicts. Attending and listening to other people gives them information to use to compare their opinion with that of others. They engender trust in others by hearing and not appearing to judge. Others flock to them. They seem nonjudgmental because they do not state the contrasts they discover. These subjectivists do verbalize their thoughts to themselves, other supportive individuals, and to their journals.

Category Four: Procedural Knowledge—The Voice of Reason. Procedurists recognize the pos-

sible inaccuracy of their intuitions and carefully employ accepted academic methods to arrive at possible meanings. They hesitate to speak until they feel sure that they have thoroughly used the techniques and procedures of reason to reach their conclusion. Then they use speech to share both their thoughts and their means to those insights. Procedurists live in a practical world rather than a subjective dream world. They objectify their insights.

Procedurists utilize connected knowing in some situations and separate knowing in other instances. Connected knowers perceive truth as emerging from trusting, understanding, and caring relationships. They believe others have important experiences to share and those experiences create reality and truth for the individual. They do not judge, they empathetically listen in order to gain intimacy, equality, and oneness with the subject or object of study. They focus more on the manner in which the other person creates meaning than on the content *per se*. An outsider cannot evaluate understanding, caring, and oneness; therefore these learners seek acceptance rather than evaluation.

Separate knowers believe knowledge exists independently from both the learner and teacher. An impersonal authority sets standards and the learner uses detached procedures to master the information to meet those criteria, to find truth. They critically evaluate ideas. When they find an error or loophole, they have difficulty expressing their disagreement for fear of hurting others or criticizing the carefully thought-out views of authority. Yet, the adversarial nature of separate knowing requires such verbal fisticuffs. They have arrived at "disinterested reason," a pure, unemotional, logical approach to truth. They argue within the accepted form for disagreement and often don't care about the content discussed. They may not even believe their own words. Since the words don't change their inner beliefs and feelings, these women often feel their oration won't change others. The objective nature of both the information and the means to gaining that knowledge simplifies evaluation procedures. Separate knowers expect evaluations.

Category Five: Constructed Knowledge—Integrating the Voices. Women with this epistemo-

logical perspective seek both subjective and objective knowing; recognize themselves as creators of knowledge; and accept the contextual nature of knowledge. These women reflect on both the lives of others and on factual information. Constructed knowers effectively handle ambiguity. They have relinquished the black/white, either/or thinking of previous stages. In fact, they attempt to integrate all aspects of life in all its complexity. They do not find it satisfying to compartmentalize. This contrasts with men who separate parts of themselves by focusing on identity and career as they try to "do it all." Constructivists recognize the self as part of their world. They seek lost parts of the self.

Constructivists ask questions, pose problems, and examine basic assumptions. Disagreements between leaders challenge them to use known procedures and their own insights to make connections. Good theories represent an educated guess based on the present state of research. Authorities gain respect from constructivists when those leaders demonstrate an awareness of this complexity of knowledge. Excitement comes from the never-ending search for truth. These women try to "really talk." Real talk means listening to hear both others and self, to understand, and to allow new ideas to grow. It requires cooperation, reciprocal sharing of personal experiences, discussion of meaning, and then analysis and synthesis. Constructivists articulately express their views in an attempt to make a difference.

These cognitive forms and epistemologic perspectives have implications for successful restructuring:

Perry dualistic stages (1-3) and Belenky et al.—silent and receiver perspectives.

- Dualistic people and those with the silent and receptive perspectives need support to help them move from their black-or-white perspective. Extrinsic rewards make them feel good about trying something new.
- Because dualistic learners and receivers of knowledge believe the authority has "the" answer, they find fault with the leader who doesn't have a clear vision of how to restructure.

Once the boss articulates the goal, these individuals will live the professed "shoulds" and "oughts." When conflicts emerge during restructuring, these people follow the higher authority. Step one in helping these people restructure requires understanding their limited method of understanding information.

- Women with the silent perspective may appear in small numbers as part of non-certified personnel. Show—don't tell—these people how to execute the changes inherent in restructuring.
- Listening women attempt the new when clear directions give sequenced information and they have appropriate models.
- Receivers of knowledge learn more from the "deflation of authority" than from those who impeccably present themselves and their knowledge (Belenky et al., 1986). Authorities make it easier for these women to gain a voice when the experts first show their humanity by sharing their learning process and discussing aspects of restructuring about which they themselves feel unsure or did not successfully execute on their first attempt. Secondly, the leaders provide listening women with the opportunities to participate in social activities or discussion groups and thus create the environment of connection and relationship that helps them gain a voice.

Perry relativistic stages (4 - 6) and Belenky et al.—subjectivists.

- Multiplistic persons try different approaches with no apparent reason. Set limits for these people. Make it crystal clear that within the realm of restructuring certain behaviors and options remain unacceptable.
- Multiplistic people zealously fight anyone. Logic does not work to stop their verbal tirade. Listen and let them play out their views. Often they trip themselves up with their own argumentativeness. They may actually argue both sides since for them anything goes.
- Subjectivists who disagree with the restructuring plan most frequently do so privately so as

not to mar interpersonal relations. Help these persons express their opinions by creating an atmosphere in which disagreements do not result in loss of connection. The day after discussing discrepant views make it a point to do something caring for the women involved.

- Put women willing to share their concerns and experiences on the restructuring committee. As subjectivists begin to trust the other women on the committee they will share their concerns. Subjective women gain new perspectives from other women, which leads to their own growth.
- Those who see the need to commit may become converts to the restructuring effort. It gives them an identity. Help them realize they cannot flatten others with their steamroller enthusiasm. Also help them gradually see the consequences of their commitment.

Perry commitment stages (7 - 9) and Belenky et al.—procedural and constructed perspectives.

- Give specific how-tos for the new intervention so procedural knowers can follow accepted methods for checking on the effects of the restructuring procedure. When those procedural knowers err, ask a leader they trust to offer criticism. They perceive such help as an opportunity to understand the appropriate methods for objectifying their insights.
- Some of the best constructive criticism comes from those with the separate procedural perspective. Remember: these women do not feel comfortable challenging the well-developed rationale of the authority. Letting them jot down their thoughts may work better than a discussion group.
- Connected knowers need a broad base of personal contact with the ideas under consideration for restructuring. Reading, national conferences, observations, and discussions will help the individual embrace the change.
- Champion those realizing the lifelong nature of commitment. Discuss and reward diverse approaches to similar goals. When doing evaluation, focus on needs reassessment. An-

swer the question: "Where do we go from here to continue growing?"

- Use women with the constructed epistemologic perspective as the shakers and movers to get the restructuring accomplished. They seek out and listen to opinions from diverse groups and then integrate those into a suggestion representative of the total group. They question assumptions, thus forcing an in-depth analysis of restructuring.

General implications

- Employees will set expectations for one another and for students based on their way of knowing. For example, staff members who utilize harsh discipline may not modify after exposure to workshops on discipline. The problem may lie in their cognitive stage of development for they may have a black-or-white perspective or have a deep belief in following separate procedures. External change requires internal restructuring.
- What happens when a follower has reached a higher stage than the person trying to institute restructuring? People at higher states perceive the world in a more comprehensive fashion than those at lower positions. When, as a leader, you sense followers see things you do not understand, defer to them, put them in charge of the topic at hand, and empower them to use their abilities for the good of the group. At the same time challenge yourself to attempt to comprehend their perception in order to foster your own self-growth.

CONCLUSION

Personnel inhabit diverse stages of cognitive development. Each will want something different from the boss and each will perceive restructuring from the vantage point of his or her own developmental locus. Knowledge of the individual increases the chance of meeting that person's needs and getting him or her to actively support restructuring. Yet a full awareness of each employee's developmental issues does not seem possible given the number of

people leaders supervise. The conundrum has no simple solution. Restructuring committees and leaders must make knowledge of this content and of the individuals they wish to affect a top priority. By so doing they will maximize their chance of success in restructuring and in helping each person grow.

This information on cognitive development suggests that some employees will lead restructuring efforts, others will willingly follow, and still others will not comprehend the requests for and the goals of restructuring. Those who do not understand may object and criticize the proposals. Leaders tend to judge the faultfinders in a disapproving manner. A vicious circle of criticism ensnares both

leaders and followers. To break the cycle, start by teaching this content to all personnel to enable them to have deeper interpersonal understandings. Accept employees at their present cognitive stage. Acting in a less judgmental and more understanding manner sends the learner the message that "you're O.K." People who receive approval for their present sense of self tend to more readily accept suggestions for change. Then you can challenge those persons to grow to higher hierarchical stages while they institute the restructuring.

NOTES

1. Research does exist challenging the invariance of stage theorists; for example, Loevinger et al., 1985.

REFERENCES

- Basseches, M. (1985). *Dialectical thinking and adult development*. Norwood, NJ: Ablex.
- Belenky, M. F., Clinchy, B. M., Goldberger, N. R., & Tarule, J. M. (1986). *Women's ways of knowing: The development of self, voice, and mind*. NY: Basic Books.
- Bents, M., & Bents, R. (1990, April). *Development of expertise in teaching prototypes: Novice; advanced beginner, expert*. Paper presented at the annual meeting of the American Education Research Association, Boston.
- Bingman, B., Mott, V., & Kasworm, C. (1990, November). *Women's ways of knowing: Implications for work, education and community*. Paper presented at the American Association for Adult and Continuing Education Conference, Salt Lake City.
- Daloz, L. A. (1986). *Effective teaching and mentoring: Realizing the transformational power of adult learning experiences*. San Francisco: Jossey-Bass.
- Dunlap, D. M. (1989, March). *Differences between men and women administrators in four settings*. Paper presented at the annual meeting of the American Educational Research Association, San Francisco.
- Hunt, D. E. (1977-78). Conceptual level theory and research as guides to educational practice. *Interchange*, 8, 78-80.
- Joyce, B., & Weil, M. (1980). *Models of teaching*. Englewood Cliffs, NJ: Prentice Hall.
- Kegan, R. (1982). *The evolving self: Problem and process in human development*. Cambridge: Harvard University Press.
- Kohlberg, L. (1984). *Essays on moral development: II: The psychology of moral development*. San Francisco: Harper & Row.
- Loevinger, J., Cohn, L. D., Bonneville, L. P., Redmore, C. D., Streich, D. D., & Sargent, M. (1985). Ego development in college. *Journal of Personality and Social Psychology*, 48(4), 947-962.
- McNergney, R. F., & Carrier, C. A. (1981). *Teacher development*. NY: Macmillan.
- Oja, S. N. (1990, April). *Developmental theories and the professional development of teachers*. Paper presented at the annual meeting of the American Education Research Association, Boston.
- Perry, W. G. (1968). *Forms of intellectual and ethical development in the college years*. NY: Holt, Rinehart & Winston, Inc.
- Sprintall, N., & Thies-Sprintall, L. (1983). The teacher as an adult learner: A cognitive developmental view. (pp. 15-35). In G. Griffin (Ed.), *Staff development*. Chicago: University of Chicago Press.
- Walker, L. J. (1989). A longitudinal study of moral reasoning. *Child Development*, 60(1), 157-166.

NEW VISIONS FOR STAFF DEVELOPMENT

Susan Loucks-Horsley, Janet Phlegar, and Suzanne Stiegelbauer

Systemic and cultural change in schools as workplaces and in teaching as a profession are intimately linked; and these links represent a powerful route to educational reform.—Fullan, Bennett, and Rolheiser-Bennett, 1990

The movement to restructure schools has had many faces; people have been compelled by a wide variety of images to change how schools operate. Some of these images portray new school settings as “effective”; some present images relate to collegiality or cooperation; some use systems of measurement as guides for direction. For us, the image that is most compelling is that of the school as a learning community—a community where all stakeholders, parents, students, teachers, and administrators, have a say in the process and product of learning and where learning is an integral part of everything that goes on in the school, for everyone involved with the school.

This image of community has its roots in history as well as in modern thought. In history we have the one-room school house, a place where students of all ages shared what they learned and helped one another. The teacher was hired by the community and worked with that community to produce learn-

ing outcomes that met community needs, i.e., that provided productive citizens for the future. While this is an ideal image and certainly different in kind from the schools of today, our vision of the school as a learning community in itself is not so different. Learning is a process that cannot be separated from the rest of the world. Learning is not just for students if we are to meet the demands of tomorrow. However, as students are the citizens of tomorrow, the focus has to be on them.

This chapter is about the role of staff development in building the schools of the future. Supporting the continual development of teachers is critical to attracting and keeping the best and brightest people in the profession. A person who has opportunities to learn and grow can best provide such opportunities for our young people. Schools that are true learning communities for adults and children alike are the only kind that hold that promise for the future. Too frequently staff development is seen as a luxury item, not an integral part of the learning experience for all involved in the school. If staff development starts with the question, “What do we (teachers, administrators, etc.) need to know to be able to facilitate the learning of our students—all our students?” and

provides a forum for putting answers into action, then teachers will have the means to address what the future holds for education. What follows begins with the premise that any staff development activity needs to be addressed to student learning first, but also needs to incorporate the learning needs of everyone involved with the educational enterprise.

THE SCHOOL OF TODAY AND THE SCHOOL OF TOMORROW

When we look around at the schools present in our communities, we find a variety of forms and institutions. Some of them are going through a process of reformation, but many of them are not. As they now exist, many schools stifle and inhibit rather than promote and facilitate learning. The focus is on rote memorization, individual achievement, testing solely for grading, schedules that force teaching and learning to be "chunked" unnaturally, curriculum delivered by discipline—approaches that work against what we have come to know it takes for young people to develop conceptual understandings and critical skills.

Similarly, schools have not nurtured teacher growth and development. Quite to the contrary, a firm distinction has been made between "teaching" and "learning." The focus on content delivery, attending to multiple demands, and standardized test scores, in addition to the isolation of teachers from one another and the relegation of teacher learning to structured inservice workshops, have all worked against the school being thought of as a place where teachers (or other adults) learn.

Those who have worked at innovation and change in American schools point out that not much has really changed in the past twenty years (Elmore & McLaughlin, 1988; Sarason, 1990). Since the early 1950s we have had the same systems for our school calendar (based on an agrarian lifestyle), grade organization, academic discipline, order and ability teaching. Even major innovations such as team teaching, open classrooms, and the like have done little to permanently change the way schools are organized or the way education is delivered.

Nevertheless, we know that the society around us has been rapidly changing and future demands on citizens for the 21st century may not even be imaginable today (Benjamin, 1989; Murnane, 1988). Young people in our schools are preparing for lives that will probably include changing careers six or eight times, and some of those careers are not currently known. The decrease in the number of unskilled jobs means that the students of today and tomorrow will have to be even more competent and more flexible than ever before in applying what they learn. More and more the future and well-being of the United States is interconnected to that of the world as a whole in political, ecological, economic, social, and almost every other way.

We are confronted with massive evidence that our schools are not delivering the quality or level of learning that students need to contend with today's demands, let alone those of the future (Murnane, 1988; National Commission on Excellence in Education, 1983). Business and industry increasingly report the need for remedial instruction of high school graduates. The United States currently ranks lower than many other countries in student achievement, especially in science and math (LaPointe et al., 1989). The fact that we fail on the national level to graduate a quarter of all students who enter school (U.S. Bureau of Census, 1982) is an indicator that our entire system of schooling is arguably "at risk." As many as forty percent of our students are only marginally successful in schools that now emphasize only minimum competency and basic skills.

Even the demographics of the near future demonstrate the need for change in our schools (Hodgkinson, 1985). We have a coming decade of fewer young people overall. In addition, the young people in our schools will be increasingly diverse in their ethnic, racial, and cultural backgrounds. Students of such backgrounds have not done well in our nation's schools, as witnessed by the higher-than-average high school drop-out rates for Hispanics, Native Americans, and African Americans (U.S. Bureau of the Census, 1982). Our teachers are not as prepared as they might be to reach these students. The problem is not so much that the system of education has changed for the

worse in a constant society, but that the system hasn't changed in response to the dramatic changes occurring within society as a whole. These are the young people on which our future depends. Schools and teachers need to be organized in ways that maximize the learning outcomes for each and every one of them.

In order to redefine what schools are so that more students succeed in getting the knowledge, skills, sense of efficacy, and social responsibility necessary to become good citizens of the future, schools will have to rebuild a sense of community around these issues. To do so will require connecting and integrating the efforts of those in the formal educational system with others concerned about children and the future of the community as a whole. Teachers, parents, students, community leaders—all must be involved. An important measure of a successful school, in fact, will be the degree to which it is an effective partner in building a shared sense of commitment around the purposes that schools serve. Our image of the community-based schoolhouse is apt here; it communicates the shared participation in a learning process, a process that supports a healthy community of the future.

This brings us to the question of how such involvement can be enacted in a redesign or restructuring process. In other words, how can a school become a "community of learners?" What kind of school design would best address the growing dilemmas of education? We know that teachers and other educators will increasingly need new knowledge and skills if they are to address our changing society. One answer lies in the relationship of staff development to the learning process itself. If teachers need new strategies to address a different population, if they need new understandings about what learning is and what environments are needed for learning to take place for all students, the absence of a process for providing such understandings means that we run the risk of redesigning our schools uninformed by what they really need to look like in order to serve tomorrow's students. Staff development has long been an "add-on" to the work of the school. In the face of this growing need for ongoing information,

problem solving, testing new strategies, and sharing information, redefining staff development offers a necessary solution.

WHAT STAFF DEVELOPMENT IS

In presenting a vision and role for staff development in a future world, we begin with the following statement: we believe that a plan for better schools needs to start with a focus on student learning. Any new design needs to first support such learning, and only secondarily design those additional pieces that are necessary to ensure that teachers and other adults are part of that learning community.

Our approaches to staff development also need to be transformed. We worry about repeating some experiences of the past in which schools invested much energy and many resources in reforms that worked for adults but not for students. Unless staff development is directly connected to the needs of the learner, it remains superficial. Our field experiences and research have taught us that staff development must be relevant to the individual, who, in his or her work with students and other professionals, applies knowledge and skills in a way that increases satisfaction and gets results. In talking about staff development as a collective set of experiences involving both individuals and the context in which they work, we come back to the image of school as a community, a community where cooperation and collegiality involve not only other teachers but students as well.

We know that there are certain characteristics that make for better staff development programs. These characteristics include collegiality and collaboration; experimentation and risk taking; incorporation of available knowledge bases; appropriate participant involvement in goal setting, implementation, evaluation and decision making; time to work on staff development and assimilate new learnings; leadership and sustained administrative support; appropriate incentives and rewards; designs built on principles of adult learning and the change process; integration of individual goals with school and district goals; and the formal placement of the program within the philosophy

and organizational structure of the school and district (Loucks-Horsley et al., 1987).

We also know that staff development in itself has the potential to be an "unfreezing influence" that gets people to consider more large-scale change; that it can be a major vehicle for developing new knowledge, skills, and attitudes; and that the characteristics of environments that support the continual learning and growth of adults is very similar to what is necessary to support a learning community for all (Owen, Loucks-Horsley, & Horsley, 1991). As such, staff development lies at the heart of reform. If schools are to provide an environment where collegiality, experimentation, the application of new knowledge, participant involvement in the change process with appropriate incentives and the like exist, teachers have to have available to them a way to respond to changing needs and situations, whether those needs be student/learner based or as a result of restructuring itself. The learning process for teachers and the school as a whole has to be part of everything else the school is involved with. Otherwise, we are caught in the same problem—schools, teachers, and students will not have the skills to respond to the world as it changes around them.

Staff development, then, is the process by which a school system can provide the learning necessary for all to meet the needs of tomorrow. It is not secondary to the restructuring or reform process but an immediate and integral part of an ongoing reflection, reevaluation, and redesign. Rather than being seen as a series of inservice workshops, staff development needs to be at once a norm and a value, made available through a wide variety of approaches that contribute to learning.

SCHOOLS AS LEARNING COMMUNITIES

When we talk about schools as learning communities, we are talking about places for those who care about student learning and continuous teacher development. Places where teachers and students together pursue compelling questions across disciplines; where it's O.K. to say "I don't know"; where asking questions and pursuing their responses is as

important as being exposed to new information; where the time schedules and assignments are tailored to the learning outcomes desired; and where knowledge is "socially constructed" (i.e., fed by discussion, experimentation, and concentrated collaboration with other learners). These are images of a school designed for learning to take place.

The Carnegie Forum on Education and the Economy of 1986, *A Nation Prepared: Teachers for the 21st Century*, presents a scenario for the kind of school that might be common ten or fifteen years from now. The image presented there is one of interactive professionalism, learning cooperatively across levels, and utilizing the community at large in problem solving and as a resource. Learning in the 21st century is best described through a sample of what happens in such schools:

Dave, an African American teacher, grew up in a community very like the one in which he now teaches. He describes how he and two other teachers ... sought out the leaders of several community-based organizations and city agencies and put together a plan for helping the teachers in the school to see the world as the students saw it, and to help the community-based organizations and city agencies coordinate their programs more closely with one another and with the school.

One effort that made a surprisingly big difference—both for the high school students and the younger students—was the program in which the older students were trained to tutor the younger ones. When many of the older youngsters discovered how superficial their knowledge was when they tried to teach something they thought they knew, they made a real effort to master the material.

We duck into a lab room where ten students are working, a few alone, others in small groups. Computer work stations are scattered about. A lab technician is working with some of the students. One group of students is developing a strategy for their full-time, three-week project to assess the toxicity of the pollutants in an open sewer.

Professional teachers run the school with an Executive Committee of Lead Teachers in overall charge. There are many other people available to

help the teacher, including paid teacher's aids, technicians, and clerical help; interns and residents working in the school as part of their professional teacher preparation programs; student tutors from the university; a few people on loan from nearby firms; and a retired person working as a volunteer tutor. (Carnegie Forum on Education and the Economy, 1986)

The common thread in this example is that of a learning-centered environment. Everything that the students, teachers, and community members do is directed toward enhancing learning. A learning-centered environment will not look like the school that most of us remember, with self-contained classrooms where teachers lectured in front of rows of students. More likely it will include, in various ways, students setting agendas for themselves with teachers as facilitators, coaches, and aids. While a shift from teaching to learning sounds easy, in fact it requires a repertoire of strategies that are not necessarily common to a teaching-centered school. These include:

- shifting the focus from teaching to student learning and doing.
- organizing adult learning and doing to foster students' learning and doing.
- providing a means for flexible planning and response to student needs.

DESIGNING SCHOOLS WITH A LEARNING FOCUS

In the shift to learning-centered schools, it is critical that assessment of student performance assumes its rightful place as an essential part of the learning process. But we need to define what we mean by assessment. Students in the U.S. are among the most tested in the world, but almost no one is happy about the way we test (Wells, 1991). Testing has been part of the selection process, not part of the feedback loop for the students, the teacher, the school, and so on. Even students who receive "A's" often don't know why they merit them; rather they consider coursework as another hoop to jump through. When we look at the variety

of skills we are really asking of the students of the future—skills related to speaking and listening, to working with others, to understanding and being able to apply complex ideas, to reasoning and problem solving—we have to ask ourselves if we are really assessing their competence in these areas and if not, what are we assessing? And further, what are we doing with the information?

Perhaps the key word here is "feedback loop." One goal of assessment is to evaluate what students learn. Another is to provide information to enhance the learning process—information that potentially initiates a process of learning for both student and teacher. The shift to a learning-centered emphasis is illustrated by the following excerpt from a case study of a group of teachers at a Vermont school who wanted to shape their pedagogy around how children think:

The criteria group pinpointed what items would make the best thinking program for their needs. They mapped out the developmental stages of children K-8 in relation to thinking skills, and assessed various programs' proven effectiveness, their relevance across the curriculum, and their costs and assessability.

The criteria group found that theories on information processing and cognitive controls best meet their needs. The professor who developed these approaches came to the school and introduced his theories and program possibilities to the entire staff. (Cox, 1990, p. 85)

With the guidance of the professor, the teachers developed a better understanding of the students' thought process. Applying this knowledge was trial and error from the start. However, their persistence paid off for the teachers and the students. As one teacher said, "These are very basic skills of what a person needs in order to learn. But I was never taught them in college. After twenty-two years of experience I'm sure I've used them many times, but it wasn't intentional. I didn't have them in my lesson plan, it wasn't really a goal. Now it is" (Cox, 1990).

Through their work with the professor, teachers found themselves suddenly "clicking" into the structure of information processing. For example, in one of the math classes a teacher was trying to explain a

concept to her students: "No one was understanding; the kids were just not getting it. Then all of a sudden—BANG—the 'thinking project' popped into my head and I focused on one of the controls that we had learned. Things started to move. I was very excited about the sudden connection" (Cox, 1990).

This whole activity began with a need, in this case a need to enhance and address learning for students. Teachers, working in cooperation with each other and the local university, developed a project that had immediate application and outcomes. This wasn't a project tangential to the learning needs of students but one intimately related to the learning environment. It is this kind of relationship that is necessary to the design of schools with a learning focus. Teachers and community members take as their learning agenda the new knowledge or skill necessary to address explicit (as in the case of a documented problem) and implicit (as in the case of new knowledge related to student learning) needs that contribute to an enhanced learning environment. Staff development becomes a part of this learning and doing process.

STAFF DEVELOPMENT WITH A FOCUS ON THE STUDENT

There are those who assume that any growth on the part of teachers is good for students, that staff development alone—no matter what it is and how closely it relates to the act of teaching—will benefit students. Some use this to justify their premise that teachers should have carte blanche to select what inservice opportunities they will take advantage of, including selecting not to attend other offerings. Teachers, they say, are more satisfied when their own needs are being met, and satisfied teachers work much better with students than those who are not. This justifies a wide array of staff development offerings, including some that focus on non-teaching areas like aerobics, stress reduction, pottery, and color analysis, some of which might be worthwhile, but do little to address student learning.

Our observations and our reading of the research indicate that there is a much more tenuous connection between student outcomes and staff

development. First, a survey of different models of staff development—including training, observation and assessment, inquiry and action research, program and curriculum development, and individually guided staff development—indicated that the only model that is clearly linked to student outcomes is training (Sparks & Loucks-Horsley, 1989), and then only if it includes several steps and sustained practice and support (Joyce & Showers, 1988).

Secondly, some characteristics of staff development that conventional wisdom points to as yielding student benefits are not as tightly coupled as originally thought. Judith Warren Little's re-examination of her 1981 study that linked teachers' collegiality and collaboration with student outcomes revealed that such a connection was difficult to keep strong, and required more attention and support than most schools can give (Little, 1986).

Finally, examination of the research on effective school programs notes that when forced to choose what areas to work on that are known to contribute to effectiveness (e.g., school mission, parent involvement, safe and orderly environment, high expectations for students), school faculties typically first choose those farthest from the teacher/learner connection. Yet changes in those areas remote from the student's learning environment are found to be necessary but not sufficient to create changes in learning outcomes (Owens et al., 1985).

We contend that spending resources on staff development for the growth of teachers and other adults in the school is only justified to the extent that it influences student learning. Yet staff development focused specifically on the teacher's work with his or her students is difficult to do, since it requires the staff development process to be more intimately connected to the everyday life of the school. This has been done in a number of different kinds of experimental settings, some of which have become a kind of norm for the schools involved. Action research strategies that ask teachers to act individually and collaboratively to collect and analyze data from their classrooms or investigate other issues relevant to their teaching have been proven beneficial to teaching and learning issues

(Hopkins 1985; Hovda & Kyle 1984; Loucks-Horsley et al., 1987). Some of the same processes have been utilized by teachers and administrators in staff meetings where a learning-centered issue has become the focus of ongoing analysis and discussion. The same is true of curriculum and program development.

After a number of field-based studies focused on the implementation of reading strategies in the classroom, Stallings (1989) came to the conclusion that teachers are most likely to change their behavior and apply what they have learned through exploration when (a) a clear need is met, (b) they can apply workshop ideas to their own classroom settings, (c) they receive support for trying out the new behavior through peer observation and analysis of what is going on, (d) a variety of approaches to the problem is presented to them or developed through a cooperative process, and (e) they learn to set new goals in their own way for their own growth. The cornerstones of Stallings' model for staff development are: learn by doing (i.e., try, evaluate, modify, try again); link prior knowledge to new information; learn by reflecting on and solving problems; learn in a supportive environment (i.e., share problems and successes).

This combination of analysis or inquiry, collaboration to solve problems, development of technical or professional skills, and implementation of a process for reflection as shown in the work of Stallings (1989), Joyce and Showers (1988), Loucks-Horsley et al. (1987), Fullan, Bennett, and Rolheiser-Bennett (1990), Fullan and Stiegelbauer (1991), and many others, is the cutting edge of staff development. What it says is that teachers, like students, need a combination of motivation and opportunity—which translates to organizational opportunities for them to learn, i.e., staff development, structure or "press," and a sense of results, of getting somewhere. Setting up such a combination to make this happen is a sophisticated process. As Fullan and Stiegelbauer state, "The teacher as learner is central to transcending the dependency now faced by teachers as they attempt to cope with streams of innovations and reforms constantly coming at them. Educational reform will never amount

to anything until teachers become simultaneously and seamlessly inquiry oriented, skilled, reflective, and collaborative professionals" (1991, p. 326).

Fullan, Bennett, and Rolheiser-Bennett portray the different elements of the classroom and school development as working together in an interactive, dynamic way. They make the assumption that "classroom improvement, teacher development, and school improvement must be systematically linked if substantial progress is to be achieved" (Fullan et al., 1990, p. 13). It is this kind of linkage that we are advocating for staff development. Through an ongoing process of development teachers can build their "generic" skills and solve specific problems at the same time. However, the focus of their work continues to be student engagement and learning. Fullan et al. write, "Impact on all students is central.... Constant valuing of and attention to student engagement and learning is a powerful, motivating force, the ultimate purpose..." (1990, p. 17)

Narrowing the focus of staff development to more directly address student learning can mean linking individual (teacher, administrator, community member) growth more closely with organizational growth, i.e., the redesign of the school. Staff development is a mechanism for something to happen in the larger environment. Narrowing the focus in this way may be considered by some as a loss. Does it mean, they may ask, that we can only have inservices on instructional strategies such as cooperative learning, learning styles, etc.? Absolutely not, although they may at some point decide to include such strategies in their instructional repertoire. Instead, narrowing the focus means that resources that had formerly been spread widely so everyone had their "wants" satisfied, can now be focused on a school-wide effort to tackle these questions: What knowledge, skills, and attitudes should our students be able to demonstrate? What kind of learning, teaching, and organizational environment will best support those learnings? In essence, school faculties will become study and design groups that are challenged with the question, "How can we really make this place a learning community for our students?"

THE TEACHING-LEARNING CONNECTION

We have worked with teachers to design staff development activities to enhance the teacher-learner connection. One of the most productive of these activities has been what we call "backward mapping," where participants identify one specific learner outcome and "map backwards" from that outcome, connecting actions at the school and classroom level that would enable the desired student behavior to occur. An important idea for participants is that enhanced learner outcomes require the systematic action of many actors, and that legitimate debate and discussion about learner outcomes are important steps in organizing efforts to ensure success for all learners.

This activity asks participants to consider defining, achieving, and assessing learner outcomes as a whole activity or action. Teachers work collaboratively to set an agenda based on a learning outcome they would like to achieve. They then debate the pros and cons of different approaches or research information necessary to enlarge their knowledge base about the issue. Teachers then take up sub-group tasks. Each group specifies the elements of one student learning outcome and brainstorms what is needed at each level (student, classroom, school, district, state, and other) to accomplish it. Groups are asked to describe accomplishment in both concrete and behavioral terms. Outcomes may include new conceptual understanding as well as the application of new information.

Part of the purpose of this activity is for groups of people to develop some shared understanding of what student learning means, which requires discussion and debate, as we have said before. One way to zero in on student-centered outcomes is to think about what students would take away with them. In some cases it might be attendance or improved scores. For some students it might be motivation, which could be more important in the long run. Further, there may be considerable overlap between the elements of one outcome and another. Looking at the "bigger picture" in combination with a specific objective can help one see how school improvement is in fact occurring.

Backward mapping as a staff development and school improvement activity has a number of advantages. Teachers frequently have trouble "seeing the forest for the trees." Time limitations, isolation, other responsibilities, and lack of involvement in shared decision making about improvement goals can all lead to a limited vision of what outcomes are attainable or desirable. Getting a clear picture of just what enhanced learning for all students might look like is a first step.

A few years ago, the state of Connecticut put together a state-level committee made up of representatives of every constituency interested in education, including students. Through review of a large body of knowledge on what young people should know and be able to do, discussion and debate with others around the state, and reflection about what they would want for their own children, the committee developed Connecticut's Common Core of Learning, which was adopted by the State Board of Education. It is a simple but powerful document. Outcomes for students are organized in three domains:

Attributes and Attitudes

- Self-Concept
- Motivation and Persistence
- Responsibility and Self-Reliance
- Intellectual Curiosity
- Interpersonal Relations
- Sense of Community
- Moral and Ethical Values

Skills and Competencies

- Reading
- Writing
- Speaking, Listening, and Viewing
- Quantitative Skills
- Reasoning and Problem Solving
- Learning Skills

Understandings and Applications

- The Arts
- Careers and Vocations
- Cultures and Languages

History and Social Science
Literature
Mathematics
Physical Development and Health
Science and Technology

—(Connecticut State Board of Education, 1987)

Each of these outcomes requires a strategy to achieve it. Some of these strategies are already in the teacher's repertoire, some are not. Some strategies are also school- or state-level strategies, not just the responsibility of teachers. However, knowing where you are going and cooperating with others to get there makes the task more concrete. Defining learning outcomes and focusing learning for teachers of all capacities to those outcomes helps keep the process of improvement on track. Defining what is needed to meet these outcomes at different levels, including things like time for teachers to learn what they need to know, is in itself a plan for restructuring. However, it is also true that such new knowledge is only as good as its application and its evaluation as part of an ongoing improvement process. As the world around us changes, developing a sense of a learning community where decisions, new information, implementation, and assessment are shared can make a difference. Through joint action, a school can move from being reactive and crisis-driven to proactively organizing for the unexpected.

SNAPSHOTS OF LEARNING COMMUNITIES

Becoming a learning community requires the interaction of all stakeholders in the educational enterprise. What might this look like? In the first of the two examples described in the following pages, teachers, students, parents, and administrators take the problem of the introduction of students immigrating from Cambodia as their main focus. The primary outcome is to ensure a successful transition of these new students. In the second example, the school as a whole was changing from a teacher-centered classroom setting to a student-centered setting where students worked at their own pace

through curriculum units with teachers acting as facilitators and guides. In each case, information from the students themselves was used as a basis for ongoing planning and assessment along with other sources. Students were involved in problem solving along with teachers and other community members. This problem solving in itself was done collaboratively, under the direction of administrators and lead teachers.

Students From Cambodia

A K-5 urban school is to receive a large number of students immigrating from Cambodia in the near future. While there are a few Cambodian students in the school and more in the immediate community, no one knows very much about the culture or ways of Cambodia or what these students might bring with them in terms of knowledge, skills, and familiarity with the current norms of the school. Teachers, parents, community members, various civic group members, and business representatives discuss the situation to decide how the school might welcome the new students and their families. One objective is to learn more about Cambodia itself, so that they can become familiar with the needs of these new students.

The teachers who have discussed ideas around this issue informally request time from the school planning council to bring up the topic at the weekly all-school meeting. The meeting time, which has replaced the traditional obligatory faculty meeting, is used to explore issues, transmit information, and problem solve. The meeting agenda is formulated by the planning council made up of teachers, the principal, paraprofessionals, and student advisors, who then post the agenda so people know what is to be discussed and can decide what actions are to be taken.

At the all-school meeting the faculty members and the parents who have gotten together some preliminary ideas make the case for having the school look into ways that it can welcome the Cambodian students. The all-school group agrees with the need and ask for others who want to help generate ideas to form a subcommittee that will bring options back to the all-school meeting.

The subcommittee begins by brainstorming what would make these students comfortable in a strange land. The subcommittee has a lot of ideas that will involve the whole school learning about Cambodia, its customs, history, and language. These are presented by the subcommittee and enthusiastically adopted by the all-school meeting.

Students in different grades work cooperatively to conduct research on Cambodia, including art projects, and even building a replica of Angkor Wat, a major Cambodian temple. The cafeteria staff learns about several foods they can prepare and experiment with. The subcommittee puts up a big map of Cambodia, and a poster of all the activities in which people in the school can be involved. The goal is to have everyone, each student, teacher, and paraprofessional learn something related to the Cambodian students and their immigrating to the United States. People put their name on the bulletin board as they participate, read, discuss, or learn something new. The few Cambodian students already in the school and their parents are interviewed about their history and trip to the United States. Students interview recent immigrants from other countries, as well as families who have been in this country for generations to compare what is similar or different about their immigration experience. Some fifth graders get interested in immigration law and write letters to their U.S. Representatives, a local lawyer, and the immigration office in their city to get information. The lawyer offers to come and talk about this topic with interested students during the morning breakfast hour. A small group of students attend the "breakfast seminar" and ask the lawyer a lot of questions.

Several students from the third grade class want to work with the fifth graders on a skit about immigration. Because of flexible scheduling, where each day there is time for cross-grade projects or individual consultation, the students have the opportunity to work together to write and practice their skit. Several of the more skilled students are charged with "verifying" the accuracy of the skit. Later in the month the skit will go "on the road" to various classrooms to teach about immigration.

Another group, headed by the school secretary and several parents, works on putting together an orientation package for the school including what is expected of students, how the school works, how parents can be involved in the school, how student progress is reported, and what the learning goals are. One Cambodian parent, who has been working on language development with students, offers to translate the orientation package.

Several of the teachers work together to identify needs and design ways to coach students on the kinds of skills they need to work and learn in various groups. In addition, the teachers' work now includes finding ways to transfer the knowledge and skill development to other areas for all of their students. As each teacher has just a few students that they actively mentor, they can spend a good deal of time with each. The ratio of teachers to students is lower than in most schools due to the reorganization. Each adult in the school mentors a group of students. Teachers talk among themselves about the information they have received about the culture of Cambodia and develop a plan for mentoring the new Cambodian students with the help of Cambodian parents presently in the community.

As the students begin to arrive, they are assigned a student "buddy" and a mentoring teacher. This teacher works with the buddy student to get to know the new students and to help them familiarize themselves with the school. New Cambodian parents are oriented to the school with the help of the local Cambodian community. Teachers, parents, and other school administrators and aids devote special time in the all-school meeting to discuss how these new students are progressing. As unique problems emerge, they continue to develop subcommittees to investigate and find approaches to the problem. Some of the most immediate problems concern low English comprehension; others concern culture shock. As each solution is tested with the students, results are brought back to the committees and the all-school meeting so that ongoing problem solving can occur.

The approach taken by this school to address new Cambodian students involves working together to provide new information, develop new skills, test those skills and refine them as part of the

normal working of the school. The school in this case looks, on the outside, not so different from the schools we know around us. What is different is the integration of a kind of staff development through group inquiry, action, and reflection.

In the next example, the school has a different structure, perhaps a unique one for secondary schools. There are no classrooms as such. Teachers develop courses in units, facilitating student completion of those units through individual consultation and seminars. Students are assigned to teachers who will act as mentors and "parents" to them through their high school experience. Students work through the course units at their own pace with the support and help of their teacher "parents" and course specialists (Anderson et al., 1990). Like the school with the Cambodian students, however, built into the school experience is ongoing learning, skill development, problem solving, and group interaction about student needs.

Project Excellence

This high school in Northern Ontario is attempting a unique approach to education. Because of declining enrollment, staff cuts, a rural environment, and the resulting difficulty of maintaining and providing a full range of courses and educationally sound methods to a small group of students, the school has embarked on a reorganization that is intended to provide more program options with fewer teachers. In addition, the potential educational benefits for students are substantial. Reports of student performance in schools implementing similar individualized systems of education are typically positive and extend to a broader range of students and outcomes than in conventional classroom-based system of secondary education.

In implementing this school-wide innovation, teachers and administrators are immediately faced with a number of situations that require creative solutions. The first of these situations involves the creation of the course units necessary for students to begin work in the Fall of 1985. The school and school board had only decided on this approach during the previous winter, giving teachers a short time to develop initial units.

The second problem for start-up concerns orienting parents and students to the new program structure. Many parents are not sure of what this program will offer their children. Both these situations are resolved through a series of group and sub-group meetings to design strategies to get the work done and meet the initial orientation needs of students and parents. Teachers, administrators, and some parents work as a team to design these initial steps.

As the year begins, student advisors meet weekly to discuss the progress of students in their care. Each advisor is assigned twelve to fifteen students to whom they will be "parent" during their four years of secondary school. In these weekly meetings teachers discuss any student who is falling behind or not responding to the material in the unit. This requires teachers to be particularly aware of student progress and work styles. One teacher states that in his twenty years as an English teacher, he has never paid as much attention to individual students as he does now. Teachers in the advisor meeting work together to come up with solutions to individual problems and follow up on those solutions in subsequent meetings.

The approach to education taken by the school, an approach which places more responsibility on the student to be an active learner, also asks teachers to take a different role. One aspect of this is to develop skills as a counselor for students, since student academic problems are often related to other issues. Monthly staff meetings are in part staff development activities designed to enhance knowledge and skills related to new responsibilities and issues. Special Education teachers, drug and behavioral counselors, and other paraprofessionals in the helping fields come to the school to work with teachers in developing their skills as "helpers" to students. Another issue that quickly arises is the need to gain the support of parents, particularly Native Cree parents, in following up with their children at home. The staff meetings evolve a system of parent, student, and teacher relationships where educational issues are discussed in a positive manner. Rather than call parents to complain, teachers design a strategy to call parents bi-weekly to tell them about their child's progress, positive

and negative, but with emphasis on gaining the parent's support and praising the child.

Through the first three years of implementation, staff development is a major area of staff activity. The school also involves other schools of similar type in defining solutions to problems that arise. By the third year, problems related to implementation drop off and the school embarks on more "in-depth" staff development. Teachers find that many of the conventional staff development activities offered to other schools in the area have little relevance to their roles as teachers and teacher advisors in Project Excellence. To fill the gap, they define their own special needs and develop information sources to address those needs. They consult students to critique the program and student input is included in assessment of growth and in staff development diagnosis. The "Native issue" becomes a focus for years three and four, and staff, parents, and some students work on developing strategies to address the special needs of Native students who often change schools frequently. Some of this work includes familiarizing themselves with Native culture. For help with this they turn to the local Native Friendship Centre as well as some Native businesses in the area.

In many ways Project Excellence is a "fix as you go" project. While the design for the organization has been long established, implementation of that design varies with each setting. The teachers, parents, administrators, and students of the school find that their sense of community evolves partly out of need. In order to make the school a good one and to satisfy student, parent, and provincial requirements, they have to develop the information, skills, and assessment strategies necessary to make the program work. As a result, staff development becomes integrated with the normal workings of the school as a part of how things are done.

A NEW VISION FOR STAFF DEVELOPMENT

We began with the position that the school as a learning community is a justifiable vision for a school to pursue. We stand firm that such schools

need to start with student learning and design their systems to support such learning. We worry about repeating some experiences of the past in which schools invested much energy and many resources in change efforts that worked for a while but in the end did not really reach students. We also recognize that approaches like these are not easy for schools. They require flexibility. They require a perspective on teacher development that sees it as important to student development. We feel that as teachers are treated as the "experts" they are, but experts who themselves deserve to know what is necessary to be experts, students will reap the benefits and teachers will be more satisfied with their careers as professionals.

We have presented staff development as ongoing learning for teachers and anyone involved with working toward the goal of student success. We do not see it as a secondary activity; nor do we see it as something to make people feel good in the short-term sense. We see it as part and parcel of everything that happens within the school as a community. As Fullan and Hargreaves (1991) state, "Teachers should also be demanding of their schools and districts to provide learning opportunities and environments." They should also "push themselves to create the professional learning environments they want." Professional development is not something that stops when you get your certificate.

We see staff development as learning by doing—evaluating, gathering new knowledge, trying it out, modifying, and trying again—in a supportive environment. We see staff development as developing links between new information and prior knowledge. We see staff development as reflecting and solving problems. We see staff development as both individual and collective and as starting from the point of what teachers are there for as professionals, making a difference to students. Within this framework, we see teachers as inquiry oriented, skilled, reflective, and collaborative professionals. However, to be all of this, schools must be structured to support it. If we are in the business of restructuring, this needs to be a part of it.

Finally, making a school a learning community for students makes it one for teachers too. This is

due to what we've come to know about the nature of learning—that learners do not receive new knowledge from the outside and simply lodge it in empty places in their brains. Rather, they construct their own knowledge from what they already know, taking in those pieces of information that fit with and enhance their current conceptions. In an environment where it is the teacher's job to figure out how to enhance the learning of each student, given

what he or she already knows, teacher knowledge necessarily grows in leaps and bounds through a series of inquiries and searches. Further, when what is known about the social construction of knowledge (i.e., that learning can be enhanced through social interactions) is understood and applied, the notion of a community of learners becomes even more vivid.

REFERENCES

- Anderson, S., Steigelbauer, S., Gerin-LaJoie, D., Partlow, H., & Cummins, A. (1990). *Project excellence: Evaluation of a student centered secondary school*. Toronto, Ontario: Ministry of Education.
- Benjamin, S. (1989). An ideascap for education: What futurists recommend. *Educational Leadership*, 47 (1), 8-14.
- Carnegie Forum on Education and the Economy. (1986). *A nation prepared: Teachers for the 21st century*. New York: Carnegie Corporation.
- Connecticut State Board of Education. (1987). *Connecticut's common core of learning*. Hartford, CT: Author.
- Cox, P. L. (1990). *Rural school improvement: Cross-case analysis*. Andover, MA: The Regional Laboratory for Educational Improvement of the Northeast and Islands.
- Elmore, R.F., & McLaughlin, M. W. (1988). *Steady work: Policy, practice, and the reform of American education*. Santa Monica, CA: Rand.
- Fullan, M., Bennett, B., & Rolheiser-Bennett, C. (1990). Linking classroom and school improvement. *Educational Leadership*, 47 (8), 13-19.
- Fullan, M., & Hargreaves, A. (1991). *What's worth fighting for? Working together for your school*. Andover, MA: The Regional Laboratory for Educational Improvement of the Northeast and Islands.
- Fullan, M., & Steigelbauer, S. (1991). *The new meaning of educational change*. New York: Teachers College Press.
- Hodgkinson, H. L. (1985). *All one system. Demographics of education, kindergarten through graduate school*. Washington, DC: Institute for Educational Leadership.
- Hopkins, D. (1985). *A teacher's guide to classroom research*. Philadelphia, PA: Open University Press.
- Hovda, R., & Kyle, D. (1984). Action research: A professional development possibility. *Middle School Journal*, 15 (3), 21-23.
- Joyce, B., & Showers, B. (1988). *Student achievement through staff development*. New York: Longman.
- LaPointe, A. E., Mead, N. A., & Phillips G. W. (1989). *A world of differences: An international assessment of mathematics and science*. Princeton, NJ: ETS.
- Little, J.W. (1986). Seductive images and organizational realities in professional development. In A. Lieberman (Ed.). *Rethinking school improvement: Research, craft and concept*. New York: Teachers College Press.
- Loucks-Horsley, S., Arbuckle, M. A., Dubea, C., Harding, C. K., Murray, L. B., & Williams, M. K. (1987). *Continuing to learn: A guidebook for teacher development*. Andover, MA: The Regional Laboratory for Educational Improvement of the Northeast and Islands.
- Murnane, R. (1988). Education and the productivity of the work force: Looking ahead. In R. Litan, R. Lawrence, and C. Schultze (Eds.). *American living standards, threats, and challenges*. Washington, DC: Brookings Institute.

RESTRUCTURING LEARNING FROM THE INSIDE OUT

- National Commission on Excellence in Education (1983, April). *A nation at risk: The imperative for educational reform*. Washington, DC: Government Printing Office.
- Owen, J., Loucks-Horsley, S., & Horsley, D. (1991). Three roles of staff development in restructuring schools. *Journal of Staff Development*, 12 (3), 10-14.
- Owens, J., Pruyn, J., & Weil, M. (1985). *Using a criterion-based school effectiveness assessment instrument: The Santa Clara County experience*. Paper presented at the annual meeting of the American Educational Research Association, Chicago.
- Sarason, S. (1990). *The predictable failure of educational reform*. San Francisco, CA: Jossey-Bass.
- Sparks, D., & Loucks-Horsley, S. (1989). Five models of staff development for teachers. *Journal of Staff Development*, 10 (4), 40-55.
- Stallings, J. A. (1989). *School achievement effects and staff development: What are some critical factors?* Paper presented at the American Educational Research Association annual meeting, San Francisco.
- U.S. Bureau of the Census. (1982). Current population reports. *School enrollment—Social and economic characteristics of students*, No. 373, Washington, DC: Government Printing Office.
- Wells, P. (1991, Spring). Putting America to the test. *Agenda*, 1, 57.

SELF-ESTEEM AND THE WILLINGNESS TO CHANGE

Judy-Arin Krupp

Positive self-esteem, "the quiet confidence in one's own potential" (Branden, 1990), characterizes individuals who willingly risk. Restructuring requires venturing into the unknown. Therefore, it behooves educators to work to enhance the self-esteem of employees if they plan to restructure from the inside out.

This chapter defines self-esteem, delineates its sources, discusses the impact of self-image and its resultant self-consistency, and then presents sixteen ways to work with employees to establish an esteeming climate. It is within such an environment that the potential exists for each individual to develop a positive sense of self and then to help others during restructuring.

DEFINITION

Self-concept, the sum of a person's thoughts and feelings with regard to self as object (Rosenberg, 1986), stems from the ability humans have to see themselves as both subject and object. When mired in an activity such as teaching a difficult class, one focuses on the tasks at hand, on survival. The teacher does not analyze his or her behavior with the class while teaching it. The teacher remains

subject. When, however, the class has ended and the teacher analyzes his or her effectiveness, he or she objectifies his or her own actions. He or she says things like, "I should have involved Frank more than I did," or "I have to find a better way to teach square roots." Thoughts and feelings emerge from the objectification of self. "I think I'm a good teacher" results in good self-feelings. Whereas, "I think I taught that poorly" may result in a depressive sense of self. Self-esteem addresses only the feeling component of self-concept.

Self-esteem, how one feels about oneself, does not equal narcissism. Individuals with high self-esteem do not need to dominate or take center stage. Those with a good sense of self take risks, lead or follow as the situation demands, reach out to others, remain humble, and care deeply about humanity. The California Task Force to Promote Self-Esteem and Personal and Social Responsibility (1990) defines this "quiet confidence" (Branden, 1990) one has in oneself as "appreciating my own worth and importance, and having the character to be accountable for myself, and to act responsibly toward others."

Those with high self-esteem feel worthwhile and competent. They say "I am lovable and capable"

(Canfield, 1987). Feelings of confidence, self-worth, and loveliness stem from *being*. "I am, therefore I am O.K." Feelings of self-efficacy, competence, and capability stem from *doing*. "I can." People with the highest self-esteem spend time both doing and being. They walk on the sand just to enjoy the experience. At the same time they set achievable goals and reach them. The greater the disparity between being and doing, the lower one's self-esteem (The California Task Force, 1990).

How many readers would classify themselves as workaholics? Workaholics do, but they ignore the importance of being. Then, if they, for example, have a serious illness and can no longer achieve, they question their own worth. Similarly, people who exist and do not achieve do not feel good about themselves because they find themselves dependent on others for financial aid or material goods. Our schools emphasize doing (cognitive) and not being (affective). Building an esteeming climate requires unifying the cognitive with the affective, but that takes us ahead of the story.

SOURCES OF SELF-ESTEEM

External and internal sources. Self-esteem comes from sources external to the person as well as from within the individual. Parents provide the primary source of a sense of self. The second most powerful influence on self-esteem comes from teachers, and peers are the third most powerful (California Task Force, 1990; Hoffman et al., 1988). External sources give approval/disapproval and feedback. As a result the young person develops the capacity to perceive self from the perspective of others and compare self to others. These capabilities permit the individual to develop a realistic appraisal of "me in the world" (Reasoner, 1988).

These external sources carry immense power. How many of us vividly remember feeling incapable and intensely embarrassed when asked to go to the blackboard to do a problem we could not handle? or the great feelings that came when a teacher showed great trust in us? Mrs. Kling, my sixth grade teacher, trusted me to go into the teacher's lounge and arrange lettuce on a tray for

a luncheon. I'm fifty-three years old now, but I remember!

It matters how we give approval or disapproval feedback to another person. Usually the person has to do something huge to get positive feedback; something infinitesimal to hear a negative comment; and when the individual does what others expect, those others say nothing. An esteeming climate "catches people doing well," ignores negative behaviors not detrimental to life, limb, or the mission of the school, and acknowledges the achievement of the expected. We need to say to personnel, "The way you manage mainstreaming has not gone unnoticed," or "I appreciate your consistent attendance," or "Your sense of responsibility deserves comment, for you have stayed late with students day after day." The feedback must relate to something significant the other person did, otherwise recipients recognize it as false.

Paying someone a compliment does not guarantee that they will feel good about themselves. How the person reacts to the feedback depends on a number of variables. For example, does the person:

- respect the person giving the feedback?
- feel he or she truly accomplished something worthwhile?
- feel good or bad about him- or herself that day?
- feel deserving of the positive feedback?
- feel the person giving the feedback emphasizes negatives or positives more than seems warranted by the situation?
- do his or her own evaluation and not really care what outsiders think?
- feel the feedback addresses a personally important or unimportant topic?

Although a compliment does not necessarily build self-esteem, those creating an esteeming climate need to continue to give positive and reinforcing feedback.

Those who rely only on external sources for their sense of self easily become "praise junkies." They seek external approval constantly and have low self-

esteem. Teachers know the child who continually comes up to the teacher's desk saying, "How do you like my new shoes?" "Did you see the way I drew the dog?" "What else can I do to get an A?" or "Isn't my new haircut nice?" Not to mention the adult who wants reinforcement for the quality ditto he or she put together, the way he or she related to a gifted child's challenge, the tie he's wearing with an old suit, and his or her willingness to team teach. To avoid this pitfall individuals need to establish an inner source of self-esteem by having a positive attitude, setting achievable goals, living their values, focusing on their strengths, seeking support, quitting negative self-talk, and taking control of their own lives (Johnson, 1986). This brings a feeling of personal power, moral integrity, and competency, which, when combined with an authentic sense of "me in the world" leads to high self-esteem (Reasoner, 1988). Leaders help praise junkies develop an internal source of self-esteem by responding to their queries with comments like, "How do you feel about your team teaching?" or "Do you like the way you worked on the team?" These types of responses force them to turn inward.

Environment. Parents and school personnel at all levels create environments that can foster or diminish self-esteem. A positive climate builds positive self-esteem. Three characteristics typify such an environment: the warmth of a parent, teacher, administrator or board member, clearly defined limits, and respectful treatment (Coopersmith, 1981). How many teachers truly listen to children? touch them? make eye contact and give them undivided attention? establish and execute rules and regulations? acknowledge the child who carries out the expectations of the group? focus on the positives? tell the children why they are special? ignore little things children do wrong? or respect the child's ability level and break tasks into small, manageable bits? How many leaders or staff developers do the same things for teachers?

A negative environment breeds a low sense of self. It does not have warmth, defined limits, or respectful treatment. Dysfunctional families fit in this category as well (Johnson, 1986). Individuals in

these surroundings do not know how to shape their behavior to a desired standard, others do not listen to them, and they lack a sense of connection and belonging.

Many schools and classrooms support and reinforce an environment that requires perfection. Teachers and leaders reward perfection. Perfect papers go up on the bulletin board. They set high standards and expect achievement of that standard. Until one gains the ultimate, he or she does not get accolades. An environment that demands perfection breeds tentative and conditional self-esteem (Johnson, 1986). Self-esteem lasts only as long as one reaches perfection and only returns when the person once more does it exactly right. Expecting perfection hurts self-esteem. Does this mean that setting high standards impedes the development of positive self-esteem? Should schools stop setting high standards? No! Schools, especially as they restructure, must set high standards, but must also reward the steps through which the person passes on the road to achieving the ultimate goal. That means rewarding improvement. Such a climate fosters self-esteem while continuing to set high norms.

Those subjected to contradictory environments are never quite sure whether to view themselves as good or bad, and tend to develop an erratic sense of self (Johnson, 1986). Mom may compliment the child while Dad criticizes. Both parents may give positive feedback when sober and negative slurs when inebriated. One teacher may compliment the child while another says he or she will never amount to anything. The principal may make positive statements about a staff-development offering, while the superintendent sends a scathing letter about the same presentation. Which should the person take seriously? Each of us has strengths and weaknesses. Those who win in life have a healthy appreciation of their abilities, and a keen awareness of their limitations. So, we need the contradictory feedback, but an esteeming climate presents it with warmth and sensitivity.

Restructured schools foster self-esteem when they provide a positive environment for gaining an external and internal sense of self. The more a

school does to build self-esteem, the more likely its employees will willingly risk trying the new restructuring process. Hardy people with a strong sense of self-esteem cope best with life (Kobasa, 1979; Witmer et al., 1983). Coping with life means effectively managing change. Restructuring means changing.

SELF-IMAGE AND SELF-CONSISTENCY

Self-image, the picture one has of oneself, breeds self-consistency. People act so as to maintain their self-image. Obese individuals work hard and long to lose weight. How many of them gradually regain the weight? Those who put the weight back on may have a self-image of "me fat." Parents who say, "I have no patience with him" will act impatiently with the child. Children who say, "I've never been able to spell" will do poorly on spelling tests. Let's assume the teacher works hard to help the child get 100% on the spelling test. The child gets support for that grade from the teacher, parents, and even the principal who announces the great achievement over the PA system. What happens the following week? The child flunks the spelling test and the teacher says, "I don't understand it, I showed her she can spell." The teacher helped the child achieve, but the child's self-image didn't change so the old behavior (flunking spelling) reappears.

An employee's self-image affects his or her willingness to restructure. How many teachers say, "Here we go again. They've got another new idea and that won't work either." If the teacher believes the restructuring plan won't work, that person will act (consciously or unconsciously) to ensure its failure.

Johnson (1986) describes a cycle wherein positive self-esteem breeds more positive self-feelings and low self-esteem results in more and more negative self-feelings. Those with a positive sense of self feel competent, capable, lovable, loving, and happy. They say things like "I can," "I'm OK," "I'll give it a stab," "I can do whatever I set my mind to," and "Today's a great day." Their actions reflect their feelings and thoughts. They reach out to oth-

ers, walk tall, make eye contact, risk, complete work on time, share their experiences, and smile. As a result of their actions they have new thoughts such as "See, I knew I could do it if I tried," "I really am OK," "When can we do it again?" "Today was a super day," and "I can't wait until tomorrow." More positive feelings ensue and so the cycle repeats itself over and over again.

People with low self-esteem feel sad, depressed, angry, unhappy, incompetent, and unlovable. They say things like, "I can't," "I won't and you can't make me," "Who needs it?" and "Why bother?" They do not make eye contact, walk with stooped shoulders and eyes to the ground, avoid risks, wait for others to come to them, act out, and don't ask questions even if they don't understand the situation. As a result they receive reinforcement for their negative thoughts. They think, "I knew I couldn't," "It is no use, because it never works," "I'm no good," "Life's no good," and "Nobody really cares." More negative feelings follow and the cycle repeats itself.

Society cannot afford to raise children with low self-esteem, for those who have low self-esteem drop out of school (Earle, 1987; Kite, 1989), get into substance abuse (Keegan, 1987; Skager, 1988), become pregnant as teenagers and decide to keep their babies in hopes that the baby will provide the unconditional love they've never received (Beane & Lipka, 1984), use contraception less often (Crockenberg & Soby, 1989), feel depressed (Battle, 1987), steal and cheat more than those with high self-esteem (Whitely, 1980), and achieve less well than those with high self-esteem (Covington, 1989).

While we cannot change the self-esteem of another, educators can establish an esteeming climate (California Task Force, 1990). An esteeming climate provides the environment necessary for each person to raise his or her own level of self-esteem. People in such an environment will more willingly embrace the change inherent in restructuring as their self-esteem rises. Helping individual workers attain a better sense of self, restructuring from the inside out, will ultimately lead to greater acceptance of the external restructuring ideas.

ESTABLISHING AN ESTEEMING CLIMATE

How can schools provide a climate conducive to building positive self-esteem? The following list of suggestions will help:

First, and foremost, school personnel and parents must have positive feelings about themselves. We cannot give what we do not have. Canfield (1987) reports that only one-third of Americans have high self-esteem. That means that only one-third, or (if we wish to show generosity to teachers) one-half, of those contacting children have the self-esteem needed to help children develop positive self feelings. Those with high self-esteem do and say what the situation warrants to support a child's sense of self. The California Task Force (1990) found children's self-esteem directly relates to the self-esteem level of their parents, regardless of the intent of parents to teach self-esteem to their children. Combs (1982) found a direct relationship between effective learning and teacher self-esteem: the higher the teacher's self-esteem the more the children learned. No one taught these teachers or parents how to build self-esteem in children. They knew what worked for them and automatically used it with children. Schools need to focus on hiring personnel with high levels of self-esteem, building the self-esteem of teachers and other workers, and providing parents with workshops and seminars on self-esteem.

Understand the three characteristics of a climate conducive to building positive self-esteem: teacher warmth, clearly defined limits, and respectful treatment (Coopersmith, 1981) and integrate them into the schools of the district.

Establish the building blocks for self-esteem (The California Task Force, 1990).

- An esteeming climate rests on a sense of security. A secure environment protects people from danger, fear, and anxiety. It encourages workers to creatively problem solve and speak their hopes, fears, and dreams. In a secure environment leaders (a) model transparency (Jourard, 1979) without fear that others will capitalize on their vulnerability and (b) they

prize failure as a demonstration of growth. Secure people feel trusted, safe, and prized for their individuality. In such surroundings people reveal their identities.

- As they share their true selves and others share with them, they feel more connected.
- A sense of belonging develops that leads to a shared mission or purpose.
- Ultimately employees work hard to achieve competence in pursuit of the mission. Teachers investigate new ideas, students achieve at higher levels, and administrators become instructional leaders.

Nurture a positive attitude by doing three things (Johnson, 1986).

- *Focus on strengths.* Emphasize the positives. "Catch them doing well." Give more positive than negative feedback. Discuss the positives at length to make sure the person heard them. Don't use the positives as a precursor to negatives. Try this simple exercise during a faculty meeting: ask employees to list their strengths, star the ones they feel glad they have, and then reflect on how much they would miss those traits if they did not have them. So often people make light of their abilities instead of prizing them.
- *Don't reinforce negative thinking in yourself or your staff.* What a person *thinks* will happen is often what *will* happen. If you believe you will have a bad day, trouble with a student, or have difficulty getting others to try the restructuring, then you will behave (consciously or unconsciously) in such a way as to bring your belief to fruition. On a recent mountain climb I had to jump many crevasses amongst the glaciers. Only once did I think I couldn't do it and might fall into the crevasse. The result: I fell into *that* crevasse and none other. An esteeming environment encourages positive thoughts.
- *Continue to set high standards, but do not require perfectionism!* This means rewarding improvement. One principal gives children B U G

awards. When they Bring Up a Grade from a D to a C they get an award. They feel esteemed. Adults also appreciate positive reinforcement when they improve.

Encourage personnel to use their support system (Johnson, 1986). Close supports are the people who remain caring and willing to listen no matter what we do. Individuals with high self-esteem seek their support. They say, "I need help" and realize their admission demonstrates their psychic strength. They do not play the "invisible please help" or "intuit please" games. Those with low self-esteem look sad hoping a loved one will intuit their need. When they do not get their need met they get angry. Individuals with low self-esteem believe they have to stand on their own feet at all times. An esteeming climate advocates the development and use of a support system by providing time for socializing, nurturing mentoring relationships, and organizing support groups. A school in Massachusetts has a group called "out of a rut." It meets once a week and personnel attend whenever and as long as need demands. In different situations personnel might appreciate age-alike, grade-alike, inter-generational, gender-alike, or mixed groups.

Set achievable goals. People who set goals and do not accomplish them do not feel good about themselves. Goal completion raises self-esteem. When restructuring take the following suggestions into account as individuals set goals (Johnson, 1986):

- *Make the goals short term.* Better to create five goals during the year than to feel married to one that the person finds too difficult, too easy, or has outgrown.
- *Make sure the goal comes from the individual who has to bring it to fruition and not from someone else.* Restructuring to please the boss is as problematic as losing weight to please a spouse.
- People do not follow through on goals they perceive as too easy or too hard. *Ask the person if the goal seems to have just the right degree of challenge to warrant the effort needed to complete it.*
- *Provide a climate for talking about goals.* People who have written down their goals or shared

them with others tend to follow up on them more consistently.

- *Set only goals the person can control.* No teacher should write a goal that says, "Each child in my class will leave at the end of the year reading at a level two months higher than when the year started." The teacher has no control over the child's reading. The teacher could say, "I will establish the best possible climate to ensure more reading competence by my students by doing..." This is within the teacher's control.
- *Set only one goal at a time.* We all know the people who say they plan to lose weight, get in shape, and quit smoking. Such a goal lasts a short, short time. A single goal does not seem as overwhelmingly difficult.
- *Write measurable goals.* How much time will the person spend on this goal? How often during the week? Must the individual do it perfectly or will 80% success do the job? Perfectionism sometimes creates a stumbling block to goal completion. People who believe achievement must occur 100% of the time set themselves and others up for failure.

Encourage the self-discipline necessary to achieve these goals. Write I.D.P.s (Individual Development Plans), provide a workshop on time management, discuss the good feelings accompanying goal completion, or establish a peer-support system. When personnel model self-discipline, they help students develop their own self-discipline. Goal-oriented, disciplined living leads to productivity. It means the individual controls the environment and lives purposefully. Such living builds self-esteem (Branden, 1990).

Esteeming climates give people a feeling of belonging or connection. Teachers know they need to put the child's name on the desk the first week of school, hug children, assign them responsibility, give them a "high-five," and listen to them. All these behaviors help the child feel connected. Do leaders do the same for teachers? Do we know about the teacher's family? Do we listen to staff? Do we give

them responsibility in an area of interest to them? Do we touch as we say we care? A sense of belonging follows closely on the heels of security as a main building block of self-esteem.

Individuals with self-esteem feel special or unique. Whether the person feels special because of his sense of humor, her caring nature, his patience, her love of learning, his desire to relate to others on their level, or her love of the red M & M candy doesn't matter. The fact that the person feels special matters mightily. Esteeming climates make people feel special. They discuss positive attributes and ask people to use their strengths to help others.

Empower students and staff to control their own learning and life. Taking control means taking responsibility for one's choices and living with the consequences of one's actions. When a person chooses to do A, he or she is choosing not to do B. Each choice requires giving up something. Each choice also requires living with the positive and negative outcomes of that decision. For example, people choose the evil of marriage over the evil of living as a single person, the evil of having children over the evil of remaining childless, and the evil of working in education over the evil of working in the private sector. We make those choices because we anticipate more positives than negatives in marriage, childrearing, teaching, or whatever.

Schools with esteeming climates encourage individuals to take control as age and maturity allow. However, leaders have difficulty empowering others for two reasons. First, some bosses find it hard to relinquish their power. Why? Some possible reasons include: leaders feel responsible for what happens in their school or district and they believe no one can do the job as well as they; administrators fear others might do the job better than they; they worked so hard for the power they do not want to give it up; or perhaps past experience with sharing power has resulted in more work. Second, school personnel, whether administrators, superintendents, secretaries, custodians, or teachers tend to care deeply for other people. They rescue others. When people do for others what others could do for themselves, the rescuer lowers the other

person's self-esteem. Rescuers raise their own self-esteem at the expense of others. The suggestion that caring educators often function in a self-serving manner sticks in our throats like a bitter pill. Yet, establishing an esteeming climate requires recognition of how so-called "good" behaviors can have negative effects.

People with an internal locus of control know events occur in life over which they have no control. These people know they cannot control certain events, but can control their reaction to an event.

When things go wrong, those who do not have an internal locus of control tend to blame. Individuals who censure those outside themselves create conflicts with others. Persons who condemn themselves develop a hopeless, helpless feeling. Neither builds esteem and in both cases the individuals see themselves as victims. Victims need victimizers (Branden, 1990). A vicious cycle of blame, defensiveness, and more fault-finding ensues. Instead of blaming, those with an internal locus of control problem solve. They ask, "what can I do to make the situation better?" Esteeming climates teach problem-solving skills.

Esteeming climates provide role models who show others acceptable and unacceptable behaviors, values, and goals. How staff dresses, how well administrators listen and respect staff, whether or not teachers hug children, whether or not the staff smokes, exercises, eats healthy food, and accepts or rejects diverse views all demonstrate to students and fellow workers the expectations in this environment. Clear norms provide a template for behaving in a manner that will result in positive strokes and good feelings about self. Models provide those norms.

It comes as no surprise that in schools where the superintendents and principals actually participate in staff development a greater openness exists among staff than in districts where the leader comes in, says hello, and leaves. Models have a deep effect on functioning.

Reinforce and support those who live consciously. Conscious living means facing your true self. It means picking up small clues from others

about your own behavior. It requires honest and constant self-appraisal. Those who live consciously make mid-course corrections that allow them to have a clear self image and positive self-esteem (Branden, 1990).

Prize those who self-assert. Assertive people say what they feel and think. They do not deny themselves so others will like them. They do not hide their feelings in order to conform. By asserting they give others, and themselves, a clear picture of their identity. Outsiders may or may not agree with the assertive person, but that has less salience to the person than his or her acting in a manner true to self. Branden (1990) says it well: "Nothing is more detrimental to self-esteem than to belong to others." Those who self-assert do not believe they belong to, they believe they belong *with* others.

Leaders, especially those trying to restructure, frequently find the assertive person a thorn in their side. When those feelings rise to the surface leaders might ask, "Do I really want a district or school filled with 'yes' people who don't think much of themselves?"

Create a district-wide norm that says "I can." People who "believe they can" stand a better chance of succeeding than those who say "I'll try," "It won't work because...", "We tried it ten years ago and it didn't work then and won't work now," "Here we go again," or "Why bother?"

Success breeds success. Self-esteem creates a recursive situation with such life situations as achieving or not achieving, feeling resentful or weighing things and relying on oneself, and risking or remaining with the tried and true (Covington, 1989; Holly, 1987; Johnson, 1986). People with high self-esteem achieve at high levels, and the more one achieves the better one feels about oneself. The same holds true for risking: people who risk tend to have high self-esteem and the more one risks the more self-esteem rises. Which comes first? No one can answer that question, but certainly self-esteem and achievement, self-esteem and risking, self-esteem and self-reliance relate to and influence one another. This creates a strong argument for building in successful experiences for staff and students to help them feel good about

themselves. After all, the more they like themselves the greater their achievement.

Accept each person as he or she appears. Such affirmation of what presently exists creates a norm for self-acceptance. Self-accepting people acknowledge their beliefs, feelings, thoughts, and actions. They can then decide whether or not they wish to change some aspect of themselves. But, those who deny parts of the self cannot change those things, for people can't change what they deny (Branden, 1990).

Look for ways to emphasize "being" as well as "doing." Create a sense of family among personnel so people feel comfortable discussing feelings. Model such discussions. Encourage hugs, sharing, and sensitivity to the needs of others. Prizing both the feeling and doing sides of an individual encourages the person to live out both aspects of the self and thus raises his or her self-esteem.

Help each person within the school or district develop the integrity of an integrated self (Branden, 1990). This means the individual's actions link with his or her thoughts and feelings. The teacher in anguish about a sick child left at home does not feel whole. He or she appreciates a leader who suggests he or she leave early for it allows him or her to act on his or her beliefs and feelings. The administrator might even take his or her class. Where we do not live in synchronization with our values and beliefs we feel guilt, shame, and stress. None of those feelings enhances self-esteem. Leaders who know their employees well stand the best chance of helping each person unify their beliefs, feelings, and actions.

CONCLUSION

It takes a lifetime to build self-esteem. Gimmicks and quick fixes just don't work. Effective restructuring of people's sense of self requires modification in the norms of the institution, integration of esteeming features into every aspect of the school, and a commitment on the part of everyone to focus on self-esteem.

This massive effort pays dividends. People more willingly risk change if they have a clear self-con-

cept and positive self-esteem. That change may involve restructuring the time frames of classes, the way parents work with schools, or the approach used to teach a lesson. For children the change may involve learning a new subject, playing with a different group at recess, or trying not to kick the person next to them in line. A clear self-image and positive self-esteem on the part of parents, students, and all school personnel eases our tasks as educators.

The most lasting dividend comes in the capacity of students to effectively live through life's changes. Those who most effectively handle the inevitable

changes across the lifespan have high self-esteem. People don't go to a physician with a psychosomatic illness because they can't do algebra, haven't read *As You Like It*, or can't classify various flora and fauna. They appear in doctors' offices because they cannot effectively handle the changes inherent in existence: children leaving home, a sick spouse, or divorce. We must teach reading, writing, and arithmetic, but we must also instill in each and every student a strong sense of self. Creating an esteeming climate provides our best hope for restructuring from the inside out.

REFERENCES

- Battle, J. (1987, June). Relationship between self-esteem and depression among children. *Psychology Reports*, 60, Part II, 1187-1190.
- Beane, J., & Lipka, R. (1984). *Self-concept, self-esteem and the curriculum*. New York: Teachers College Press.
- Branden, N. (1990, February). Presentation made at the California Conference on Self-Esteem, San Jose, CA.
- California Task Force to Promote Self-esteem and Personal and Social Responsibility. (1990). *Toward a state of esteem: The final report of the California Task Force to Promote Self-esteem and Personal and Social Responsibility*. Sacramento, CA: California State Department of Education.
- Canfield, J. (1987). *Self-esteem and peak performance*. Boulder, CO: Career Track.
- Combs, A. (1982, April). Affective education or none at all. *Educational Leadership*, 39(7).
- Coopersmith, A. (1981). *The antecedents of self-esteem*. Palo Alto, CA: Consulting Psychologists Press, Inc.
- Covington, M. (1989). Self-esteem and failure in school: Analysis and policy implications. In A. Mecca, N. Smelser, & J. Vasconcellos (Eds.), *The social importance of self-esteem*, (pp. 72-124). Berkeley, CA: University of California Press.
- Crockenberg, S., & Soby, B. (1989). Self-esteem and teenage pregnancy. In A. Mecca, N. Smelser, & J. Vasconcellos (Eds.), *The social importance of self-esteem*, (pp. 125-164). Berkeley, CA: University of California Press.
- Earle, J. (1987). *Female dropouts: A new perspective*. Alexandria, VA: National Association of State Boards of Education.
- Hoffman, M., Ushpiz, V., & Levy-Shiff, R. (1988, August). Social support and self-esteem in adolescence. *Journal of Youth and Adolescence*, 17(4), 307-316.
- Holly, W. (1987). *Self-esteem: Does it contribute to students' academic success?* Eugene, OR: Oregon School Study Council, University of Oregon.
- Johnson, H. (1986). *How do I love me?* (2nd ed.) Salem, WI: Sheffield Publishing Company.
- Jourard, S. (1971). *The transparent self*. New York: Van Nostrand.
- Keegan, A. (1987, February). Positive self-image—A cornerstone of success. *Guidepost*. Alexandria, VA: American Association of Counseling and Development.
- Kite, H. (1989). *How to prevent dropouts*. Paper presented at the National Self-esteem Conference, Orlando, FL.
- Kobasa, S. (1979). Stressful life events, personality and health: An inquiry into hardiness. *Journal of Personality and Social Psychology*, 37(1), 1-11.
- Reasoner, R. (1988, January). Does self-esteem cause academic success? *Self-esteem Newsletter*, 4(1), 2. Available from the Center for Self-Esteem, PO Box 1532, Santa Cruz, CA 95061.

RESTRUCTURING LEARNING FROM THE INSIDE OUT

- Rosenberg, M. (1986). *Conceiving the self*. Malabar, FL: Robert E. Krieger.
- Skager, R. (1988). *Prevention of drug and alcohol abuse*. Sacramento, CA: California Attorney General's Office.
- Whitely, J. (1980). *Moral character development of college students*. Irvine, CA: University of California at Irvine.
- Witmer, J., Rich, C., Barcikowski, R., & Mague, J. (1983, October). Psychosocial characteristics mediating the stress response: An exploratory study. *The Personnel and Guidance Journal*, 62(2), 73-77.

COGNITIVE COACHING: A SIGNIFICANT CATALYST

Robert J. Garmston

It is the bureaucratic structure of the workplace that determines what professionals do far more than personal abilities, professional training, or previous experiences.

—Frymier, 1987

THE PROBLEM

How do we create schools that are intellectually stimulating places for both students and adults, schools that are self-renewing organizations, schools that entice and hold our most intellectually capable teachers, schools that develop the cognitive capacities of each person who works there, and from this, schools that adequately prepare students for contributions in a shrinking, changing, intercultural world?

Never, in our wildest nightmares, have we been confronted with such staggering educational complexities and such massive and impotent efforts at school reform. Nor has the world witnessed such a frenzied flurry of political, social, and economic change, such an interdependent array of nations, large and small, hungry and well-fed, and such separate ecological problems.

Today the unprecedented pace and scope of national and world change is undisputed, and the puzzling failure of American education to effectively respond is lamented by parents, politicians, the business community, and educators alike. We've moved well beyond the age of the parenthesis described by Ferguson (1980) and are irretrievably entangled in an information age of instant communications and electronic, genetic, microbiologic, and atomic inventions, on nearly a weekly basis. To survive in today's world, students need more knowledge and more skills than ever before. Furthermore, fundamental to each student's survival (and the survival of our world) is an array of intellectual skills, such as the ability to analyze, extrapolate, problem solve, problem seek, retrieve information, restrain impulsivity, think allocentrically (that is, from the perspectives of others), collaborate, envision, dream, and create.

Schools were not designed with these learning goals in mind. In the great restructuring of the mid 1800s, schools were reorganized to respond to the new social order: economy (grade level groupings and single texts); local control (school boards); quality and free education (public taxes); teaching

to the societal needs of the day (morals, obedience, and capacity for employment in simple, repetitive factory jobs); and the sorting of workers into the classes of the professional, white collar, blue collar, and unemployed.

Today we have new needs, a new world, and require a new school order. Strategic management consultant Bill Cook (1989) asserts that schools are in crisis, meaning that they will get worse or get better. Joel Barker (1989) observes that when old systems no longer work, new systems, or paradigms (ways of seeing and making meaning) are required. In each new paradigm, old interpretations, organizations, relationships, and procedures suddenly give way to the new.

Since the 1983 publication of *A Nation At Risk* we have lavished enormous energies, resources, and thinking into helping schools and students meet the realities of today's chameleon world. The reason these efforts have not borne better fruit is because they have operated in the tired paradigm of the 1800s. The calls in the late 1980s and early 1990s for the "restructuring" of schools and the empowerment of teachers to professional stature are recognition of the need for a change in our education system, yet the clear and urgent danger is that we will tamper only with the appearance of schooling, not its soul. Cook (1989) observes that in this country we don't fix something until it shows, and then we adjust the schematic, not the substance.

Many writers, among them Rosenholtz (1989), Saphier and King (1985), Deal and Kennedy (1982), and Frymier (1987) are arguing that the political, technical, and professional models of school change we have been employing so vigorously since the 1950s (remember the "new math" and other new-wave curriculums?) are not working, but that in specific settings, certain applied anthropological models of change are producing significant results.

THE SOLUTION

The solution is to restructure schools from the inside out. Such a deep restructuring consciously modifies the very culture of the school, involving its

members in integrated collaborative efforts toward achievement of common themes, goals, and values. A powerful theme meets several criteria: it has broad application, it is pervasive, it reveals fundamental patterns, and it fascinates (Perkins, 1991). A commitment to the development of the mind as the central role of the school would meet these requirements. Such a commitment is in accord with a gradual move toward what Harmon (1988) terms "transcendental monism." This is an emerging metaphysical perspective in western culture which views reality as an organic whole, at times transcending the direct experience of humans. Several premises consistent with this view would frame and guide a school's commitment to the development of the mind.

1. There are no limits to the human mind other than those we believe in.
2. The brain is what is; the mind is what the brain does.
3. The mind is the source of all sensation, perception, thought, emotion, and behavior.
4. Mind and body are inextricably intertwined neurologically, chemically, and electrically.
5. To learn any new body of knowledge, skill, behavior, emotion, or attitude involves an engagement and alteration of the mind.
6. Humans are makers of meaning and knowledge is constructed, both consciously and unconsciously, from experience.
7. The greater portion of mental activity occurs outside conscious awareness and strongly influences our beliefs, values, choices, and interpretations of reality.
8. The finest manifestations of highly functioning minds include allocentricism, spirituality, health, joy, creativity, empathy, and community.
9. All people, at all ages, can continue to develop mentally.

The second requirement is a vision of a new school culture that moves beyond the paradigm of an industrial society and reflects the following developments.

1. Schools are an expression of wholeness, the interconnectedness with other social agencies and the interdependence of all humans.
2. School faculties are communities of leaders, bound by core values, common goals, caring, respect for diversity, and the ability to fight gracefully (struggle together, not against each other).
3. Schools are reflective, examining their products and processes in a continuing flow of self-renewal.
4. Schools are catalysts for the development and contribution of each person's unique personal and professional identity, reflecting their personal history, culture, gender, race, interests, training, knowledge, and skills.
5. Schools promote empowerment, choice, and responsibility for self and community for each person, young and old, in the school.

Seeing schools as organizations devoted to the development of the mind and as cultures congruent with an information age represents a new paradigm. In any new paradigm, the familiar is seen with fresh eyes. Entire beliefs, perspectives, and ways of integrating reality change. The kaleidoscope turns, revealing new patterns.

This chapter will examine how cognitive coaching (Costa & Garmston, 1991), as a peer coaching strategy, can contribute to the twisting kaleidoscope of school reform. In this new paradigm is a commitment to the development of the mind of the teacher as a central focus of a school's staff development program, and the promotion of a new school culture in which collegiality, risk taking, honest communication, and experimentation are continuing expressions of school renewal.

ASSUMPTIONS

Saphier and King (1985) find twelve school norms essential to self-renewing schools. While many organizational procedures can contribute to these, cognitive coaching makes a unique contribution to schooling by changing the very meanings teachers construct about teaching, learning, administrators,

and themselves. A discussion of cognitive coaching as a peer coaching model follows.

Cognitive coaching is based on four assumptions congruent with the premises presented earlier about teaching, human growth, and learning. The first assumption is that all human beings are capable of change, that each can continue to grow cognitively throughout a lifetime, and that each person possesses a vast reservoir of untapped potential.

A second assumption is that teaching cannot be reduced to a formula or a recipe. While there is an enormous amount of information today about specific instructional behaviors that produce certain student learnings, there are limitations to this knowledge. In the body of process-product research studies, there are always certain "outlier" teachers who do not use the behaviors being studied but obtain good results in student learning. Still other teachers who *do* use the behaviors produce poor results. Thus, while we have *knowledge* about teaching, we do not have *certainty* about teaching.

Another fundamental assumption is that a teacher's observable classroom performance is based on internal, invisible skills—thought processes that drive the overt skills of teaching. Shavelson (1973) proposes that the basic teaching behavior is decision making. Peterson and Clarke (1986), reviewing the research on teacher cognition, describe a four-phase cycle of instructional decision making in which teachers engage before, during, and after classroom instruction. The first phase includes all the thought processes that teachers perform prior to classroom instruction—the *planning phase*. The second includes those mental functions performed during the teaching act—the *interactive phase*. The third is the *reflective phase* in which teachers look back to compare, analyze, and evaluate the decisions that were made during the planning and teaching phases. Finally, there is an *application phase* in which teachers abstract from what has been learned during their own critical self-reflection and then project those learnings to future lessons. They then cycle back to the planning phase.

A fourth assumption is that an enlightened, skillful colleague can significantly enhance (mediate) a

teacher's cognitive processes and therefore the teacher's perceptions, decisions, and teaching behaviors.

GOALS

Peer coaches keep three major goals in mind while employing the processes of cognitive coaching: trust, learning, and autonomy. The first goal is trust—trust in the process, in each other, and in the environment. Both parties in the coaching relationship need to trust and respect each other. Cognitive coaches believe that people have the inner resources to achieve excellence. Increasingly, they place that faith in the coaching process. As peer coaches work together in a non-threatening relationship, they realize the intent of this process is to grow intellectually, to learn more about learning, and to mutually increase their capacity for self-improvement. So, cognitive coaches work toward long-range gains. Occasionally, with a new teacher, it may be necessary to help save a lesson, but that is not generally the goal. Cognitive coaches also trust and contribute to an environment that signals norms and values related to a collaborative inquiry into teaching and learning.

A second goal is learning. All learning requires an engagement and transformation of the mind. To learn anything well—a golf swing, a poem, or a different way of teaching—requires thought. Coaches, therefore, skillfully engage each other's intellect, maintain the teacher's access to his or her higher cognitive functions, and employ tools and strategies that will enhance teachers' perceptions and expand their frames of reference.

The third, and most profound of the goals, is that of developing cognitive autonomy. Cognitive coaches work from a mental coaching map: a protocol of specific objectives for the preconference and postconference. Once they have internalized that map, they can focus on each other without distractions. Coaches can then use their relationship and mediational skills to help the teacher think aloud with a colleague. As a result of cognitive coaching over time, teachers' ability to self-monitor, self-analyze, self-evaluate, and self-prescribe dramatically increases. Indeed, the ultimate pur-

pose of cognitive coaching is to modify teachers' capacities to modify themselves.

COMPETENCIES

To accomplish the three goals of cognitive coaching, five non-judgmental mediational competencies are required. It is important that the coach remain non-judgmental throughout the coaching process so that teachers can think without fear of being judged. When people detect external judgment, their thinking short-circuits.

The first of these mediational competencies is posing carefully constructed questions intended to challenge the teacher's intellect and to cause the teacher to deeply reflect on teaching plans, behaviors, and results. The second skill is paraphrasing. Interestingly, the paraphrase is probably the single most important communication tool and yet the most underused. Paraphrasing communicates that "I am attempting to understand you, therefore I value you." Because it conveys such powerful empathy, its use permits deep and tenacious probing.

The third is the skill of probing for specificity, clarity, elaboration, and precision. For example, "Which students specifically?" or "What else were you considering when you reorganized the assignment?" Probing invites and promotes deeper, more detailed thinking that results in greater consciousness and more analytical, productive decision making.

The fourth skill is using silence. Wait time with students has been found to be a significant tool that leads to more creative and reflective thinking. Good coaches also use wait time on three occasions: after asking a question, after the question has been answered, and again in modeling reflection, after the coach has been asked a question.

A fifth competency is that of collecting data and presenting it objectively. Skillful coaches assist the teacher in designing strategies, or they draw from their own repertoire of data-gathering techniques relevant to the teacher. The coach and teacher can then examine the data in a literal and non-judgmental way (Costa, Garmston, & Lambert, 1988).

Thus, cognitive coaching processes are much like a Socratic dialogue. The better thinkers coaches

are, the more capable they are of producing and stimulating thinking in others.

THE MODEL

It cannot be overstressed that cognitive coaching is a *non-evaluative* peer coaching model. It is very similar to the original clinical supervision model developed by Anderson and Goldhammer (1969) and Cogan (1973). Their intent (distorted in some peer coaching approaches that grew out of a recent "clinical supervision" model), was to provide a collegial relationship that supports teachers in becoming critically self-reflective about their work. Cognitive coaching simply adds a "cognitive," developmental dimension to the processes of Anderson, Goldhammer, and Cogan.

Cognitive Coaching includes a preconference, a lesson observation, and a postconference. Thus, the format of the coach's role is compatible with the four phases of thought that effective teachers (or any competent, thoughtful problem solvers for that matter) perform.

A great deal of importance is attached to the preconference. Without it, teachers are more likely to be anxious about the observation, and coaches will lack the teachers' valuable guidance for their data collection. Because the quality of the teaching plan affects the quality of all that follows, the preconference addresses the most important of all the phases of instructional thought. Additionally, skillful preconference questions about teacher thinking during the lesson heighten teacher meta-cognition and improve decision making. For example, during planning teachers may identify lesson outcomes, envision student behaviors from which successful learning can be inferred, and anticipate criteria the teacher will use to guide the pace of the instruction. Effective teachers, like winning athletes, mentally rehearse what they will be doing to produce desired results prior to performance (Garfield, 1986).

In the preconference the peer coach invites the teacher to elaborate on student learning goals; describe how the teacher will ascertain, during the lesson, what students are learning; anticipate teacher thinking during teaching; detail the teacher's plan;

and identify areas in which the peer coach can gather objective data for the teacher. The peer coach thus becomes another set of eyes for the teacher and a mediator of the teacher's processing of his or her own teaching experience.

During the lesson itself the peer coach collects only information about student learning and the data the teacher requested during the preconference. Such observations may focus on student performance indicating goal achievement, on-task behavior, or a particular student's problem behavior. The coach will also be requested to collect data about techniques that teachers are striving to perfect: wait time, questioning strategies, proximity, movement, clarity of directions, etc. While this may sound demanding, as peer coaches gain experience, they can frequently do a quality preconference in ten minutes or less.

The postconference frequently begins with an open-ended question such as, "How do you feel the lesson went?" I say "frequently" because while coaches have certain conferencing objectives they intend to meet, the dialogue is more individualized and Socratic than it is a recipe. An open invitation allows the teacher to decide how he or she will enter this conversation and begin self-assessment. The next question may be something like, "What are you recalling from the lesson that's leading you to those inferences?" This question focuses on another important cognitive function of teaching—monitoring and recalling what happened during a lesson. Notice in the following example how the coach begins open endedly and then asks the teacher to recall specific indicators of student behavior the teacher is using to support his impressions.

Marilyn: Well, how do you think it went, Lloyd?

Lloyd: I'm not sure yet. I think I have to talk it through a little bit. I think it went well. I got back from the students during the first three minutes of interaction what I expected to get back from this group—that they wouldn't have any specific gross misconceptions about the two concepts. When we started to do the exemplars though, I felt like, at least at one point, that I was losing them. I had the

feeling I was talking with or working with only about five or six students.

Marilyn: What did they do that made you feel that way? (Costa et al., 1988)

This approach differs from some coaching systems in which the coach simply feeds back what was observed and recorded on a taped script. Because the ultimate goal of cognitive coaching is self-modification, teachers need to develop the ability to monitor their own and their students' behaviors and to recall what happened in the lesson. Data collection is fundamental to their self-analysis and self-coaching. Processing the data from the lesson enables teachers to reconstruct and analyze what went on while they were teaching to make the teaching experience intelligible.

Next, the teacher may be asked to interpret the data—to compare desired with actual outcomes: "How did what happened in the lesson compare with what was desired?" Teachers may also be asked to infer what they observed in the lesson in terms of cause-effect relationships. The teacher then may be asked—if it is appropriate—about some teaching strategies and techniques that in hindsight he or she might have done differently, that might have produced different results. Finally, the teacher is asked to project and apply what has been learned: "How will you use these insights in future lessons or in other aspects of your work?" Notice the positive presuppositions that are embedded in these questions. They infer that this is a process concerned with self-motivation and self-directed growth. The job of the coach is to support the teacher in this natural mental journey.

BENEFITS

As can be seen in this description, cognitive coaching mobilizes faculty energy around the development of the teacher's mind. Peer coaches report that they are deriving enormous satisfaction from using this process. Coaches make comments such as: "A teacher came up with alternatives that would have never occurred to me," or "A teacher who has not been very reflective is telling me that when he catches himself in old patterns, he now

employs alternatives" (Garmston, 1990). Administrators describe how they use the coaching process as they peer coach each other, talking through plans for staff development training or a crucial parent meeting. Teachers report that the process is enjoyable and exciting, that it makes them think, *and* that as a result of the coach's modeling higher-level questions, probing, and paraphrasing, they are using those same non-judgmental behaviors with students!

Cognitive coaching also influences the culture of the school by supporting the development of teacher certainty about non-routine technical cultures. Routine technical cultures are those in which workers are taught to apply a routine solution to pedagogical problems (Rosenholtz, 1989). These cultures are typically associated with somewhat inelastic approaches to a variety of situations, worker identity as "labor," and limited worker self-esteem and motivation. In non-routine cultures, workers (teachers) draw on personal knowledge of the continuing array of situations they face. In these cultures, teachers feel more efficacious, experience less stress, perceive themselves as professional, and produce students who are more capable cognitively, socially, and academically.

Said another way, some teachers report that cognitive coaching has changed their sense of professional identity (Garmston, 1990). To change one's identity is the most profound and far-reaching of all staff development interventions, because as identity changes, so does one's personal view and all related perceptions, attitudes, and behaviors.

A number of teachers report that, because they have learned to withhold evaluation in post-observation conferences as coaches, self-evaluation could take place. By withholding both praise and criticism, asking open-ended questions that cause colleagues to think metacognitively about their instructional decision making, and probing for specificity, teachers experienced themselves in a different professional light or identity—not as professionals who received feedback about what is effective and what's not effective in their teaching, but as professionals who autonomously and consciously developed those insights for themselves (Garmston, 1990).

If teaching performance is driven by the invisible skills of cognitive processes, will more cognitively adept teachers produce better teaching and better student learning? According to some early studies on teaching and according to findings beginning to accumulate on cognitive coaching, the answer is yes. Sprinthall and Theis-Sprinthall (1983) report compelling evidence that teachers who function at higher cognitive levels produce higher achievement in students. Characteristic of teachers at these higher levels is the ability to empathize, to symbolize experience, and to act in accordance with a disciplined commitment to human values. These teachers choose new practices when classroom problems occur, vary their use of instructional strategies, elicit more conceptual responses from students (Hunt and Joyce, 1967), and produce higher-achieving students who are more cooperative and involved in their work (Harvey, 1967). Witherall and Erickson (1978) found that teachers at the highest levels of ego development demonstrated greater complexity and commitment to the individual students, greater generation and use of data in teaching, and greater understanding of practices related to rules, authority, and moral development. Glickman (1985) concluded that successful teachers are thoughtful teachers and they stimulate their students to be thoughtful as well. Garmston and Hyerle (1988), and Garmston (1989) found that university-level teachers who were cognitively coached in a year-long peer coaching program improved in critical self-reflection, increased use of certain cognitive skills related to exemplary teaching, increased their confidence about and enthusiasm for teaching, and reported gains in student learning and satisfaction.

GETTING STARTED

It has been said that there are many roads to Rome. There are also many routes to the initiation and implementation of a peer coaching program that facilitates the development of the mind and a self-renewing school culture. What follows are three catalysts for this journey: (1) developing vision and rationale, (2) selecting a peer coaching model, and (3) adopting six key program attributes.

Develop Vision, Purpose, and Rationale

The most enduring programs begin with a vision of the school as an organic whole, supported by a solid philosophical base. When your peer coaching program is fully achieved, what will you see and hear teachers doing? How frequently, with whom, on what topics, with what skills, toward what purposes? Of all these questions, clarifying program purposes is most crucial. Just as the best teachers are guided in their day-to-day decisions by their sense of purpose for the year, the best programs are founded on a clear and unambiguous base of values and goals. These understandings give direction to the important steps of program initiation, recruitment, implementation, support, monitoring, and adaptation.

Clear statements of values and rationale not only guide program design, they become vehicles of attracting, focusing, and motivating participants and come to represent standards of program accountability and evaluation. To most powerfully serve these ends, planners must avoid the tendency to develop laundry lists of educational values, and instead identify three to five core values and purposes the peer coaching program is intended to serve.

This is particularly important at the outset because clear values and purpose inform the selection of which model of peer coaching to employ. Later, at the stages of implementation, support, monitoring, and adaptation, program decisions become easier when the values are clear.

Select A Peer Coaching Model

Several types of peer coaching models exist. Selecting a model congruent with program purposes is an essential step done best in the initial planning stages by persons passionately articulate about the vision prior to opening program design to group decision making. This is true because without prior experience of the transformational nature of a complex and demanding peer coaching program, it is natural for designers to choose easier, softer ways. While fresh labels and topics for peer coaching appear nearly every year (Ackland, 1991), all are some permutation of three basic models. These three models have been described as technical, collegial, and challenge coaching (Garmston, 1987).

Technical Coaching helps teachers transfer training to classroom practice, while deepening collegiality, increasing professional dialogue, and giving teachers a shared vocabulary to talk about their craft. This approach assumes that objective feedback given in a non-threatening and supportive climate can improve teaching performance. Technical coaching generally follows staff development workshops in specific teaching methods; the model pairs consult with teachers or teachers consult with one another.

The technical coaching model grows out of the work of Joyce and Showers (1983). Teachers given technical coaching generally will (1) practice new strategies more frequently and develop greater skill, (2) use the new strategies more appropriately, (3) retain knowledge about and stick with the new strategies for longer periods of time, (4) teach the new strategies to their students, and (5) understand their purposes and uses more clearly (Showers, 1985).

The positive effects of technical coaching are not without their price, however. With only a moderately difficult teaching strategy, teachers may require from twenty to thirty hours of instruction in its theory, fifteen to twenty demonstrations using it with different students and subjects, and an additional ten to fifteen coaching sessions to attain higher-level skills (Shalaway, 1985). These hours add up in costs for consultant time and released time.

The major goals of *collegial coaching* are to refine teaching practices, deepen collegiality, increase professional dialogue, and help teachers think more deeply about their work. *Cognitive coaching* is a member of this family of coaching. This model assumes that teachers acquire and deepen career-long habits of self-initiated reflection about their teaching when they have opportunities to develop and practice these skills. The long-range goal is self-coaching for continuous, self-perpetuating improvements in teaching.

Collegial coaching, most often conducted by pairs of teachers, concentrates on areas the observed teacher wishes to learn more about. The observed teacher's priority, rather than an instructional method presented in an inservice workshop,

determines the coaching focus. The peer coach routinely gathers classroom data about the teacher's priority (giving directions, for example), evidence of student learning, and the teacher's instructional decisions and behavior. The coach facilitates the observed teacher's analysis, interpretation, evaluations, and self-prescriptions for future teaching.

When using *cognitive coaching*, each peer coaching cycle is about far more than the single lesson being taught and observed. Because the teacher reflects five times on a coached lesson (prior to the preconference, during the preconference, during teaching, after the lesson, and during the postconference) and because the peer coach skillfully mediates the mental operations generic to all lessons, teachers move progressively to a state of autoplaticity, or molding themselves from each new lesson they teach. Importantly, this form of coaching can reduce the costly high number of coaching sessions required by technical coaching to automate new teaching strategies.

Training in peer coaching is the single largest cost in the collegial coaching model. Because the skills required to mediate another person's thinking are complex, a considerable investment needs to be made in training, monitoring, and follow-up.

Challenge coaching helps teams of teachers resolve persistent problems in instructional design or delivery. The term *challenge* refers to resolving a problematic state. The model assumes that team problem-solving efforts by those responsible for carrying out instruction can produce insightful, practical improvements. Since trust, collegiality, and norms supporting problem solving in professional dialogue are prerequisite conditions, challenge coaching often evolves from other coaching approaches. Challenge coaching differs from technical and collegial models in its products and processes.

Challenge processes start with the identification of a persistent problem or with a desired goal. Challenge coaching is done in small groups; technical and collegial coaching are most often done in pairs. Unlike technical and collegial practices, non-teachers like aides, librarians, or administrators are sometimes included in challenge teams for their

special perceptions, expertise, or potential role in a solution.

In summary, when choosing a coaching model, planners must identify the vision for the school, the outcomes they want to achieve, and the resources they are willing to commit. *Technical coaching* is most effective for transferring teacher training to classroom application, but it requires a high number of costly classroom observations.

Collegial coaching (cognitive coaching is one form of this approach) is most effective for promoting self-initiating, autonomous teacher thought and improving school culture, but training coaches is the major cost of this approach.

Challenge coaching is most effective for solving instructional problems but usually requires prior experience with one of the other models. Additionally, challenge coaching is usually done by a subset of the staff with high interpersonal and problem-solving skills, and not with an entire faculty.

Incorporate Six Key Program Attributes:

Six practices support successful peer coaching programs. They are (a) providing choice, (b) providing substantial initial training, (c) providing close first-year monitoring, (d) communicating program expectations, (e) involving peer coaches in program problem seeking and problem solving, and (f) providing support, linkage, and acknowledgment.

Providing Choice In reviewing six years of successful high school staff development programs that centerpiece peer coaching, Garmston and Eblen (1988) found that possibly the most significant feature of the program was a commitment to offering teachers real options and free choice. Collaborative decision making and teacher choice consistently characterized this program. Program and operational decisions were made at both the district and the school level. An inservice committee was the formal district-level decision-making body composed of an equal number of teachers and administrators. This type of decision-making structure is supported by Showers, Joyce, and Bennett (1987).

This committee made decisions concerning: topics for summer inservice training; whether the

program should be voluntary or mandatory; whether the program should be open to non-tenured teachers as well as tenured; the selection of summer program topics and presenters; the criteria and processes for staff selection; and scheduling the inservice program.

District guidelines were developed regarding the peer coaching component of the program, and each building was granted considerable latitude in implementing the peer coaching process within these guidelines. This placed demands on school principals to be managers of the adaptation process. Principals, viewed as "first change facilitators" because of their position, power, and influence (Hord, Rutherford, Huling-Austin, & Hall, 1987), worked with "second change facilitators," assistant principals, department chairs, and others. In one school, the principal organized the cadres. In another, an assistant principal coordinated the program. In a third school, a peer coaching leadership team, composed of teachers and administrators, oversaw the program.

The organization of peer coaching cadres also varied by school. The size of cadres changed from two to five; some cadres were formed from different disciplines, while others contained teachers from the same department. The district guidelines established a minimum number of observation cycles. Some schools set a higher number.

Choice and participation in decision making were also present at the level of the peer coaching cadres. Each cadre selected the instructional strategies on which to focus, the data-collection instruments to be used, and the coaching model. Because most of the summer sessions presented cognitive coaching, most cadres used this model. However, a few used technical coaching, which addresses the transfer of training to classroom practice.

Choice also existed for each individual teacher. Participation in the summer training program and in peer coaching cadres was voluntary. Over ninety-eight percent of the participants in the summer program became peer coaching cadre members. This program recognized individual situations where teachers could not participate for a year, but then rejoined a cadre the following year.

Providing Substantial Initial Training in Peer Coaching Because in the high school district studied by Garmston and Eblen (1988) the first peer coaching training occupied only eight hours, follow-up workshops were needed to "reteach" some key peer coaching conferencing skills, like preconference probing for clarity. In later years, initial peer coaching increased to twelve hours. Today, in that setting, we would recommend sixteen initial hours of training.

Because cognitive coaching for many teachers is a paradigm shift requiring that many common (and valuable in other contexts) tools such as praise and evaluation be put on hold in favor of the more empowering and harder-to-master strategies of skillful questioning and the withholding of judgments, deep training is needed. From working in depth with dozens of districts, we have found a twenty-four hour, first-year training program in coaching to be most desirable. Ideally, this training is offered in two sets of two days each with liberal time for application between sessions. One of the strongest training designs I have seen is in Omaha, where teachers meet to practice and deepen skills between the two sets of two-day trainings.

Providing Close First-Year Monitoring of Coaching Practices and Reteaching When Necessary It is important to get a new approach headed in the most constructive direction as quickly as possible. Garmston & Eblen (1988) found that too little support had been provided during the first year of coaching practice in the high school program mentioned earlier. Since initial teachers are pioneers, their choices and paths become very influential for later generations. Deep assistance for a first-year group accelerates the successful implementation of coaching for the generations to follow.

Communicating Program Expectations Clearly identify the expected frequency of coaching sessions, starting dates, and other operational procedures for the coaching cadres. Procrastination is the friend of the uncertain. Since schools are always busy places and have a particularly busy rhythm at the beginning of the year, it is predictable that coaching cadres, feeling some uncertainty about new ways of working together, would delay forming and getting started in their observations.

Since the frequency of peer coaching affects collegial norms and instructional practices, it is important to form the cadres early and conduct as many observations as the system will bear. Administrative expectations for frequency and starting dates should be communicated at the beginning of each year. As part of their normal scheduling routines, cadres should keep administrators informed of when they meet. Additionally, cadres should know that administrators will always support their interest in exceeding a minimum number of coaching contracts. One school averages more than twelve peer coaching cycles per year. Some early research on a peer coaching program using cognitive coaching (Foster, 1989) suggests that six to eight cycles may have a transformational influence on teaching.

Involving Peer Coaching Participants in Problem Seeking and Problem Solving About the Program Formalize a monitoring system whereby participants can identify program problems and work on their resolution before, unattended, they grow to proportions large enough to erode morale, dilute practices, or subvert the purposes of the program.

Many schools do this by assigning a "teacher in charge" at the site, who regularly calls together a peer coaching advisory group to identify satisfactions and problems, and recommend solutions. Where multi-school peer coaching programs exist, representations from these groups often meet to perform the same function at a district level.

To date, not much has been written about the logistics of supporting peer coaching programs. Two California educators (Weatherford & Weatherford, 1991) have made an attempt to rectify this by developing a handbook for implementing peer coaching.

Providing Support, Linkage and Acknowledgment Peer coaching requires a large investment of teacher time, energy, and risk. To sustain these precious resources, coaching rewards must be high and support plentiful.

Ultimately, the richest rewards of coaching are intrinsic: satisfaction in personal growth, pleasure at assisting a colleague, and deepening friendships. Teachers benefit as they apply coaching skills to

teaching, and develop growing senses of self in new professional identities as contributors to a professional community. Becoming interested in and influencing the learning program for students in the entire school often accompany shifts in professional identity.

But teachers' discretionary time is limited, even precious. In the first steps of the journey toward intrinsic rewards, some benefits must be immediate. The realization of leveraged time is one such benefit. The investment teachers make in refining the principles and skills of cognitive coaching also manifests itself in much of their work with students. Helping teachers realize how their instructional energies converge (Fogarty, 1991) on common themes through authentic assessment, TESA, cooperative learning, and site-based management, *simplifies*, rather than complicates teachers' understanding of their work. Thus, the leverage occurs by applying competencies learned in one context to other settings. One could argue, in fact, that the basic competencies of coaching—questioning, paraphrasing, probing, silence, and data collection and reporting—are the foundation competencies for the major leadership roles in restructuring schools: presenting, facilitating, consulting, and coaching.

How do districts support, link, and acknowledge teachers' efforts in coaching? Many successful programs are supported by a resident priest-cheerleader, who keeps everyone conscious about *why* they are doing what they are doing and applauds their efforts. Like a campaign sloganeer, this person persistently focuses teachers on the values and the purposes of the program. Most frequently, successful programs are supported by a principal who takes this role.

Many schools regularly provide substitutes for teachers who want to observe a colleague. In these settings teachers feel recognized and acknowledged as professionals by the board and administrators. Morale is strong. In one Nebraska district, a rotating sub releases teachers on one day for peer observations. On the second day, instead of attending a faculty meeting, teachers meet to postconference.

In a district in Washington, teachers and instructional aides take peer coaching training together.

Teachers regularly coach and receive coaching from these paraprofessionals with whom they work side by side on a daily basis. In High School District 230 near Chicago, teachers' prep periods are arranged to be compatible with those of coaching partners. Subs and department heads take classes while teachers observe each other. Preconferences are held before school, and both team members post-conference each other during their prep period.

Other school teams develop different resources. One district gives each school a substantial peer coaching budget. Another district places a rotating substitute specializing in thinking skills in classrooms to release teacher-coaches. This saves teachers preparation time for substitute lessons. Another district gives teachers faculty meeting time to practice peer coaching skills and helps teachers work out self-releasing patterns. For example, one teacher might take his and a colleague's class to physical education (or to the library, or to view a film), while the released teachers peer coach. Sometimes a department head or specialist teacher takes a class so teachers can observe one another.

One junior high gives personal preparation credits to teachers who spend a certain amount of time peer coaching. Later in the year, teachers can exchange the credits for a personal leave day. Peer coaching can also be supported by structuring coaching teams across departments or grade levels. Because of this, faculty members become aware of their colleagues' common resources and problems. This is an effective strategy for improving school-wide understanding and culture, particularly in systems where some programs appear to be less highly valued than others.

Administrators can show that they value teachers' coaching work in personal ways: asking a teacher to explain the program to visitors, sending a personal note, or discussing teachers' roles in a school newsletter. One principal wrote a letter to the local newspaper extolling her pride in teachers' coaching work. The morale boost was powerful and long-lasting. In another school "secret pal" types of acknowledgments are made public in faculty meetings. In yet another school, teachers receive \$100 of credit for the purchase of discretionary supplies. However, they cannot spend it but can only give it

away to another teacher who has helped them in some way. Furthermore, they cannot give it privately, but only publicly, in a faculty meeting.

Schools are complex places. Everybody is working hard on multiple agendas, programs, curricula, and demands. Sometimes it feels overwhelming. A final way teachers can be supported in peer coaching is by helping them apply their coaching skills and purposes as they interact with faculty, working together as collegial problem solvers and planners.

A SIGNIFICANT CATALYST

Leadership is the ability to focus groups of people for sustained periods on common goals that are complex and have multiple and long-range benefits. If schools are to be restructured, the relationship and dynamics among administrators, teachers, and the classified staff and community must be transformed. In some schools, particularly where informed, proactive principal leadership is present, the very nature of supervisor-teacher relationships are undergoing a positive change (Garmston, 1990). In these systems, teachers report changes in professional identity, the most powerful catalyst of systematic change.

"It feels like my brain is actually better at decision making when I am teaching. I'm not sure what it is—it's like I have more alternatives, a larger repertoire of ideas I can use in different situations."

"I now come to the principals as an equal—equal problems, equal abilities, equal disabilities, equal 'I don't know what's going on.' The peer coaching has reinforced that."

"I think peer coaching has strengthened our voices as individuals and as a group with the administrator. We feel stronger and feel validated on what we know about instruction."

"What a change! We're giving ourselves permission to try things" (Garmston, 1990).

But to successfully create schools that are inherently self-renewing, intellectually stimulating, and that can prepare all students for the 21st century, we must consciously improve the structure of the workplace. Since it is the workplace culture that influences what professionals do far more than the personal biography of individual teachers, Frymier (1987) concludes that to empower teachers, change efforts should focus on the structure of the workplace, not on the teachers we seek to empower.

Cognitive coaching, like any innovation all by itself, is too small and can be too isolated to cause a true revolution. However, its principles represent a new paradigm in which thinking is the core of the curriculum. The school's role is to develop the mind and to develop cultures that support this mission. Because of this, cognitive coaching can be a significant catalyst for realizing a new reality through the turning kaleidoscope of educational reform.

REFERENCES

- Ackland, R. (1991, Winter). A review of the peer coaching literature. *Journal of Staff Development*, 12(1), 22-27.
- Anderson, R., & Goldhammer, R. (1969). *Clinical supervision*. New York: Holt Rinehart and Winston.
- Barker, J.A. (1989, January). *Discovering the future: The business of paradigms*. [Videotape]. Burnsville, MN: Chart House International Learning Corporation.
- Cogan, M. (1973). *Clinical supervision*. Boston, MA: Houghton-Mifflin.
- Cook, B. (1989, April). *Urgency of change: Implications for strategic planning*. Paper presented at ASCD Leadership Conference, Washington, DC.
- Costa, A., & Garmston, R. (1991). *The art of cognitive coaching: Supervision for intelligent teaching*. Sacramento, CA: Institute for Intelligent Behavior.

- Costa, A., Garmston, R., & Lambert, L. (1988). Evaluation of teaching: A cognitive developmental view. In W. J. Popham & S. J. Stanley (Eds.), *Teacher evaluation: Six prescriptions for success* (pp. 145-172). Alexandria, VA: Association for Supervision and Curriculum Development.
- Deal, T., & Kennedy, A. (1982). *Corporate cultures: The rites and rituals of corporate life*. Menlo Park, CA: Addison-Wesley.
- Ferguson, M. (1980). *The Aquarian conspiracy: Personal and social transformation in the 1980s*. Los Angeles, CA: J.P. Tarcher.
- Fogarty, R. (1991, Winter). Enabling teachers to enable learners. *Cogitare*, Newsletter of the ASCD Network on Teaching Thinking, 5(2), 2.
- Foster, N. (1989). *The impact of cognitive coaching on teachers' thought processes as perceived by cognitively coached teachers in the Plymouth-Canton Community School District*. Doctoral dissertation, Michigan State University, Detroit, MI.
- Frymier (1987, September). Bureaucracy and the neutering of teachers. *Phi Delta Kappan*, 69(1), 9-14.
- Garfield, C. (1986). *Peak performers: The new heroes of American business*. New York: William Morrow & Company.
- Garmston, R. (1990, Winter). Is peer coaching changing supervisory relationships? *California ASCD Journal of Supervision and Curriculum Improvement*, 3(2), 21-28.
- Garmston, R. (1989). Cognitive coaching and professors' instructional thought. *Human Intelligence Newsletter*, 10(2), 3-4.
- Garmston, R. (1987). How administrators support peer coaching. *Educational Leadership*, 44(5), 18-26.
- Garmston, R., & Eblen, D. (1988, Spring). Visions, decisions and results: Changing school culture through staff development. *Journal of Staff Development*, 9(2), 22-28.
- Garmston, R., & Hyerle, D. (1988). *Professors' peer coaching program: Report on a 1987-88 pilot project to develop and test a staff development model for improving instruction at California State University, Sacramento*. Sacramento, CA: California State University.
- Glickman, C. (1985). *Supervision of instruction: A development approach*. Newton, MA: Allyn & Bacon.
- Harmon, W. (1988). *Global mind change*. Indianapolis, IN: Knowledge Systems, Inc.
- Harvey, O. J. (1967). Conceptual systems and attitude change. In C. Sherif & M. Sherif (Eds.) *Attitude, ego involvement and change* (pp. 38-39), New York: Wiley.
- Hord, S., Rutherford, W., Huling-Austin, L., & Hall, G. (1987). *Taking charge of change*. Austin, TX: Southwest Educational Development Laboratory.
- Hunt, D. E., & Joyce, B. R. (1967, May). Teacher trainer personality and initial teaching style. *American Educational Research Journal*, 4(3), 253-259.
- Joyce, B., & Showers, B. (1983). *Power in staff development through research on training*. Alexandria, VA: Association for Supervision and Curriculum Development.
- National Commission on Excellence in Education. (1983, April). *A nation at risk: The imperative for educational reform*. Washington, D.C.: Government Printing Office.
- Perkins, D. N. (1991, Winter). Mindware and the metacurriculum. *Cogitare*, Newsletter of the ASCD Network on Teaching Thinking, 5(2), 1.
- Peterson, P., & Clark, C. (1986). Teachers' thought process. In C. Wittrock (Ed.), *Handbook of research on teaching*, (3rd ed.) (pp. 255-296). New York: MacMillan.
- Rosenholtz, S. (1989). *Teachers' workplace: The social organization of schools*. New York: Longman.
- Saphier, J., & King, M. (1985, March). Good seeds grow in strong cultures. *Educational Leadership*, 42(6), 67-74.
- Shalaway, L. (1985, September). Peer coaching...Does it work? *R & D Notes*, National Institute of Education, 6-7.
- Shavelson, R. (1973). *The basic teaching skill: Decision making*. (R & D Memorandum No. 104), Stanford, CA: Stanford University School of Education.
- Showers, B. (1985, April). Teachers coaching teachers. *Educational Leadership*, 42(7), 43-48.
- Showers, B., Joyce, B., & Bennett, R. (1987). Synthesis of research on staff development: The framework for future study and state-of-the-art analysis. *Educational Leadership*, 45(3), 77-78.
- Sprinthall, N., & Theis-Sprinthall, L. (1983). The teacher as an adult learner: A cognitive development viewpoint. In G. Griffin (Ed.) *Staff development: Eighty-second yearbook of the National Society for the Study of Education (Part II)*. Chicago: University of Chicago Press.

RESTRUCTURING LEARNING FROM THE INSIDE OUT

Weatherford, N.S., & Weatherford, D.G. (1991, Spring). *Professional growth through peer coaching: A handbook for implementation*. Unpublished master's thesis, California State University, Sacramento, CA.

Witherall, C. S., & Erickson, V. L. (1978, June). Teacher education as adult development. *Theory into practice*, 17, 229-238.

OLD LESSONS, NEW DESIGNS

James Bellanca

In June, 1972, Principal Ralph McGee at New Trier East High School in Winnetka, Illinois, approved a teacher made plan to design an alternative school within a school. Twelve teachers representing seven departments received a summer stipend to create the mini school. They were joined by four parents. There were only two parameters: (1) The design could cost no more than the district's per pupil expenditure, and (2) The design could be as radically different as the committee decided, as long as any practice selected was educationally defensible.

The design team, divided into three sub groups, spent the first month devouring all it could read on educational theory and practice. Each week the groups met to analyze, debate, and critique. By the second month, a framework began to emerge, emanating principally from Carl Roger's theories on self-direction. By the end of August, the framework, approved by the school board, was a full blown model school waiting to spring into life. It bore little resemblance to what became known as "the parent school."

- There were 150 students, selected from "parent approved" applicants, five full time faculty, one classroom converted to a "com-

munity center" with faculty-adviser stations, small group study areas, as a school within a school with learning opportunities "beyond the walls."

- Fifteen students in an advisory group, which met once a week for three hours to set goals, review learning selections, solve problems, assess learning and provide mutual support. Once a week each student conversed one-on-one with the adviser.
- Once a month community meetings took place. In September, faculty and students brainstormed individual and group projects, planned study and community activities. During the school year, the meetings focused on governance issues, celebrations and special interest topics.
- Faculty met twice weekly for staff development and to review individual student's progress.
- Students in adviser groups set five- and nine-month learning goals in light of graduation requirements; selected learning mode (small group studies planned with a faculty facilitator, parent, or community volunteer; internship; individual project; class in parent

RESTRUCTURING LEARNING FROM THE INSIDE OUT

school, limited to one per semester; class at community college or university; or other opportunity which fit the student's goals and was approved by faculty adviser, advisory group and parent); set assessment methods (portfolio, journal, products, written feedback or conference summary from faculty or volunteer facilitator) and benchmarks; and wrote a summary self-assessment (using written feedback from each facilitator) at the end of each semester.

- No grades were given. All assessment by a facilitator was provided in a one-page summary. The feedback sheet detailed what the facilitator perceived as the positive aspects of the student's study, and what needed improvement, and gave specific directions for improvement. The student, separately, completed a similar summary assessment, inserted all project assessments in a portfolio with learning product samples, and synthesized the key elements with the adviser.
- Students were not required to fulfill the parent school graduation requirements. They were required to fulfill state mandated courses such as consumer education, driver's education, and physical education. The adviser approved the method selected and approved work completed for state mandates.

After the first year, the Center community established its own graduation standards. (During the first year, a group of students worked with a state legislator and the State Superintendent of Public Instruction to gain legislative approval for a local school board to allow alternative graduation requirements for programs such as the Center.) The Center's new requirements framed an individualized graduation process. Each student, working with the adviser and the adviser/peer group, was expected to show progress in "becoming self-directed." This meant setting goals, planning the content and method of study, and assessing accomplishments.

On the micro level, the student worked according to this process in each learning mode. (For instance, if the student elected an internship, a writing group, or individualized computer science project, a parent school PE class, and a museum study group, the student would plan and assess each of these modes.)

On the median level, the student planned how to meet state requirements and, by year two, began to develop specific post graduation goals. If college was a direction, the student, aided by the adviser, was expected to identify what content (i.e., two years lab science, three years English) was needed. If a trade school was the goal, the student planned the course of learning in that framework. With the adviser's help, the student selected "what" was needed, "how" that learning might best occur, standards for achievement, and possible means of assessment.

At the microlevel, the "self directed learning process" focused on moving the student from goals that encouraged interest, exploration, learning style investigation, and required course completion to goals that focused on career identification and mastering the process of self-directed learning. By January of a student's twelfth year, she assembled her portfolios and petitioned her adviser group for graduation. The group, guided by the adviser, reviewed the student's work with special attention to the process elements, state requirements and completion of necessary work for the student's "after high school" goals.

With the groups approval, the student then prepared for the "graduation semester." This process began with the forming of a graduation committee, which would include the adviser, two or more peers, a parent, and another adult with whom the student had worked or studied. The student developed a plan to demonstrate her ability to manage an *in-depth* study in the self-directed learning mode. The committee would agree on criteria, means of evaluation, benchmarks, and time lines. In late May, the students would

present their requests for graduation with supporting evidence, their total portfolio and the products of their final "projects."

In the course of the Center's years, these projects ranged from a National Merit Scholar's, who wrote a minuet (the student wrote the score, prepared the quartet, and played in the quartet. The principal evaluator was a member of the Chicago Symphony Orchestra) to the establishment of a lawn care business by two "slow learners," who came from the high school's "basic" track. (The students raised the money to buy their own equipment, set up their marketing and accounting systems, obtained licenses, and turned a profit. Twelve years later the two operated the company with fourteen employees.)

- In addition to the "content" requirements, each student petitioning for graduation was asked to demonstrate how she or he contributed to the learning community. A graduation committee could ask a student to increase the quality or quantity of those contributions in the final semester. Very few students, after one year in the program, had any difficulty meeting the Center's "expectation for caring." Voluntary and spontaneous peer tutoring, learning support groups, and community group celebrations became unquestioned daily practices.
- Students controlled their own clocks. Although students were expected to meet the state-mandated five instructional hours per day, the variety of learning modes required that each student maintain an individual schedule monitored by the adviser. In reality, a minute number of students starting the program failed to meet these minimum requirements. If, after consultation with the adviser, the student continued to struggle with this basic self-directedness, the student could be counseled to return to the more rigid time structure of the high school's traditional schedule. If the student chose to stay, failure to meet the minimum requirements could re-

sult in no credit for that semester. Although a few students failed to adapt to self-regulation, most students quickly found themselves struggling with over-crowded schedules. The smorgasbord was far too rich and tempting. For most students, the challenge was learning how to limit the learning hours, how to select the best modes of learning, and how to create in-depth learning projects.

In June, 1984, the Center closed its doors. Many factors contributed to its demise. Although, in itself, the Center had proven to be a valuable learning opportunity for most of the students who passed through its doors, its greatest value may be the insights it provided into the possibilities for educational reform.

THE PLUSES

Parent Involvement

Although the initial thrust came from a cadre of teachers, parents participated in a variety of ways from the first day the design team met. There were equal voices in the study sessions, the basic design and the final recommendations to the school board. When it came time to invite students to apply, the design team's faculty and parent members conducted "family forums" to explain the program and to discuss its implications for the students.

From the first day the Center opened, parents were active and important participants. Each parent had to sign for a student's entry into the program, review evaluation summaries and attend two parent-student-adviser conferences a year. Some parents volunteered to facilitate learning events and projects. A few facilitated small group literature studies. Others hosted student interns, chaperoned student planned excursions, and sat on learning review panels.

Faculty Collegiality

The five teachers worked and learned as a team. There was no guide or map to duplicate. Their touchstones for decision making and problem solving were the "self-directed learning principles"

RESTRUCTURING LEARNING FROM THE INSIDE OUT

created by the design team. Together, the faculty explored ways to be "non-directive" without losing a struggling student; ways to adapt to their new roles as learning facilitators rather than content deliverers; ways to find resources; ways to respond to 150 diverse schedules and maintain a focus; ways to resolve conflicts, among students and themselves; ways to manage a budget. None of these challenges were a part of their formal training. What they discovered was the strength, the joy, and the pain of collegiality as they explored uncharted and unfamiliar territory.

Administrative Support

Once he had approved the concept for the Center, Ralph McGee entrusted the planning and the implementation to the five faculty. During the years of the Center's operations, he met several times a year with the faculty. At those meetings, he discussed the program's progress, listened with empathy to its problems, and encouraged the faculty. Whenever a special problem arose, he discussed its resolution with the Center team and helped them to resolve it.

Focus on Significant Learning

The design team began with a set of assumptions about learning. In these descriptions, the team framed the processes and structures which would most enable the students and faculty to reach the Center's goals. These assumptions, many of which anticipated current thinking by cognitive psychologists, were derived partly from the writings of Carl Rogers, partly from design team members' intuitions:

- Internal motivation is essential to learning.
- Learning is an interactive sense-making process between learner and material and among learners.
- A school functions best when it supports and encourages the individual student's desire to discover. It functions least effectively when it creates structures, procedures, processes, and locations that inhibit the freedom to discover.
- Self-directed learning is a lifelong process, in which students take increasing responsibility for

refining their ability to set challenging goals, plan and assess their own learning choices.

- The teacher's primary responsibility is to facilitate the student's learning of the self-direction process.

From these assumptions sprang the Center's *non-organized* organization, designed to encourage each student to assume the choice-making responsibility for learning. Changes in the minimal structures came from student-faculty agreements, as experience with the program provided insights on how the Center, the students and faculty could increase the focus on the self-directed learning process. The most notable change was the addition of the graduation committee. The original design team placed the final review and approval with the faculty adviser. In the first two years, the faculty felt that they were holding students too much to isolated "discipline" and not encouraging sufficient interdisciplinary connections. A parent-student-faculty study group designed the graduation committee process and recommended clearer guidelines and benchmarks for recognizing "self-directed" learning.

Student Collegiality

Not until the Center was four years old did any of the facilitators receive formal training in cooperative learning. In the early years, they facilitated the adviser groups, challenge teams, community meetings, and study groups on the basis of a combination of group process theory from a one-day institute with the psychology department of the University of Illinois, Chicago, intuition, and the experience of one facilitator with consensus building in his Quaker Church. In year four, two Center facilitators attended a week-long cooperative learning training session with Roger and David Johnson. What they learned enabled the Center community to refine their understanding of how groups function. It also provided the facilitators with assurances and confidence that they were on track. Most importantly, it provided a framework for the students and faculty to assess the quality of interaction throughout the learning community.

Evidence of the power of bonding was readily available by the end of the Center's first year. Students whose pre-Center school records were marked by absenteeism, tardiness, and truancy became diligent about their appointments and group commitments. Students phoned other students to check on assignments. Cliques and ability group labels dissolved in the Center. Teams formed to do the housekeeping in the community room.

Complex Concepts

A common attribute of the faculty selected for the Center was a commitment to complex problem solving and critical thinking as the central approach to their content-oriented teaching. This quality, amplified by the self-directed learning and assessment processes, became a hallmark of Center studies. Freed from the restraints of "covering" a curriculum, the facilitators developed multiple strategies to examine the curriculum through the eyes of complex thinking processes.

- A study of triangles by nine students and their faculty facilitator began with a field trip to the John Hancock Center. For the first task, three groups reviewed the multitude of angles in one of Chicago's architectural wonders. Next they talked for several hours with an architect about the design features before they created "new" designs based only on triangles. Additional tasks helped them examine the mathematics of triangles. They read Lewis Carroll, did homework problems on triangles, wrote a triangle poem about famous historical triangles, took the math department's unit tests on triangles, and designed a futuristic city using only triangles.
- A study of "Death of a Salesman" included acting lessons from Goodman Theater students; a mini-production on a stage in the round built by the students; a post-theater dinner for parents cooked by the students; followed by a debate between four students and their parents on the merits of the play.
- Two students duplicated Skinner's rat-in-a-maze experiment; wrote their analysis,

including points that they disputed with Skinner; and submitted their project findings to a national competition.

- A student intern at Chicago's Botanical Garden analyzed a fungus that was killing flowers in one section of the garden, and designed a non-chemical treatment program which didn't work.
- Students studying China concluded their study with a "Peking Duck" meal; set up the faculty dining room as a restaurant; served the meal to faculty and parents; provided traditional Chinese entertainment; and donated the profits to a fund for Chinese orphans. Preparation included study of Chinese history and geography, literature and music, business practices such as accounting and business financing, and Chinese cooking. In addition to the faculty facilitator, the group worked with a restaurateur, a banker and an accountant.

The most common method used by the study groups was similar to Sharan and Sharan's group investigation model (Sharan & Sharan, 1976). After students brainstormed interesting topics for investigation, students interested in a topic joined together (2 or more was a group) and would ask "If we had our wishes, what would we like to learn about this topic?" After listing all the "druthers," the group would ask, "If we had our wishes, how would we like to learn about this topic?" This was followed by another list, and then discussion to prioritize the selections. From the selections would emerge a rough plan submitted to the faculty. They would review the plan. Whoever was most interested from the five facilitators would join the group. If none felt able (on the basis of time available, interest, or expertise) one facilitator would help the group find the facilitator or resource experts it required. The facilitator would assist the group in refining questions and assessing the answers to its inquiry.

Interdisciplinary Study

A common complaint voiced by students entering the Center concerned the "vaccination" model of instruction. They perceived course work in the

regular high school program to be disconnected "like single vaccination shots." In the Center, the facilitators made great effort to encourage multidisciplinary studies.

A study of Russian history included the discussion of several novels. The group concluded the study with the presentation of a play the students wrote about the last days of the Czar. A course on Chicago included an interview with Gwendolyn Brooks; an architectural tour; the reading of a Belows novel; a research study on Chicago mayors; and guest lectures by a Chicago policeman, a newspaper reporter, and a TV journalist. A math study included a study of Lewis Carroll's *Alice in Wonderland*; an astronomy experiment; and a research paper on the history of algebra.

Authentic Goals, Authentic Assessment

The design team was concerned that traditional high school instruction and curriculum was too far removed from the students' ability to make sense of what they were learning. They reasoned that a student who focused on learning how to take charge of her learning would better discover her own internal drive, interests, and expectations; would better be able to use those forces to make sense of the world. Goals and concepts, therefore, became the priority over isolated and apparently unrelated facts. The goals, designed and assessed by the student, became meaningful and authentic to the student. The assessment process, rather than being a grade or a test score on isolated skills and tasks, became more authentic as the students used a variety of means to reflect on the self-directed process as well as its production. Student journals, frequent facilitator-student conferences, peer group reviews, and self assessments were gathered into the portfolios which were reviewed four to six times a year.

THE MINUSES

A look back at the Center, a "break the mold" design innovation for a 1970s secondary school, reveals several significant drawbacks. These drawbacks, coupled with a change in the nation's educational mood, contributed to the Center's demise, but left important lessons.

A Non-Systemic Design

The Center was conceived as an alternative school within a school. In those days of radical student behavior, the New Trier administration saw the Center as a safety valve. Students were demanding "relevance" in their classrooms, an end to lecture dominated instruction, respect for divergent thinking, and the opportunity to earn a "meaningful" diploma.

The high school administration elected to resolve the growing conflict between student demands and established structures by steering a middle course. Their solution was an "alternative" program, housed in a remote corner of the school for those students who could convince their parents that an alternative program was "better for them." In retrospect, without more system support than the principal's encouragement, the Center was unable to sustain itself.

Less than three percent of the high school's faculty were involved in planning and maintaining the Center. While another five percent supported the Center's goals and methods, the majority knew little about the program. In one study conducted in the program's fifth year, seventy percent of the faculty perceived the Center in negative terms. Eighty percent of that group perceived the Center as an economic drain on the high school budget; sixty-six percent did not understand the concept; eighty-three percent knew little or nothing about how the program operated; and forty-six percent discouraged interested applicants, especially the students they considered "above average." This last statistic was especially alarming in light of the Center's college placement and scholarship record, a record which paralleled that of the "parent school."

As a result of the tepid administrative support and growing opposition from parent school faculty, Center faculty found themselves spending more time defending the program and recruiting students as each new year came along. It was the administration's contention that the Center must survive on its own merits. In this context, the Center faculty were distracted more and more from instructional time with students.

In most respects, the Center functioned as a loose attachment to the "parent school." It had a budget, controlled by the Center faculty; framed its

own integrated curriculum; scheduled students in a multitude of "learning" places outside the school walls; and used adjunct faculty. A few students took a class in the regular schedule, but most saw themselves as Center students, not New Trier High School students. As the Center matured as an independent school housed in the high school building, the connections to the high school became more and more tenuous. By the fifth year, the administration, sensing the high school faculty's negative attitudes, began to pull back on its support. By the seventh year the principal was suggesting the Center's closure.

Because the Center was conceived as a conflict resolution strategy, support continued only as long as the threat of conflict remained. While some members of the school board who voted the Center into existence believed that the Center would initiate substantive changes, those changes never occurred. From the outset, no substantive connections were planned to ensure that the "safety valve" was a permanent fixture. The high school administration provided some quiet support to the Center faculty, but did nothing to ensure linkages with the full faculty nor to plan a systemic change. When linkage issues surfaced, the administration placed the burden on the Center faculty to defend its work.

Declining Parent Involvement

In the first years of the Center, parents, including two school board members, led the charge to establish the alternative school as an innovative learning community. In the latter years, more parents, angry with alleged "mistreatment" of students in the parent school, gravitated toward the Center because of its reputation for caring about and attention to individual students. Many of these were parents whose adolescents were at risk. That aspect of the Center, which provided these young people with the support of a learning community, individualized learning, and attention to motivation, had more appeal than parent involvement. In fact, by the end of the Center's existence, one faculty member estimated that the balance had swung from high parent involvement in innovative learning modes to high parent expectation of one-on-one support of and attention to their children. The faculty, overwhelmed with an expanding

population of at-risk students, had insufficient resources to address this shift.

Faculty Burnout

"Whenever someone suggest we do away with bells and schedules," wrote a former Center teacher, "I smile. I hear so many defenders of the rigid schedules and time limits we have in high school say that 'adolescents need these structures.' For someone who has taught seven years without the structures, my answer is 'wrong.' The schedule and bells are there to prevent teacher burnout."

The teachers who worked in the Center, as well as the many volunteers, universally agree that the program's Achilles heel was the tremendous drain on a teacher's energy. Their discussions attributed the drain to two causes: a change in student population and a decline in administrative support.

With the exhilarating opportunities to create significant learning experiences, came the fourteen-to eighteen-hour days, sometimes seven days a week, to make sure every student was successful. Adolescents, bursting with energy and ideas, were not contained by bells, walls, or schedules. They wanted to discover the world. The Center faculty encouraged that exploration. However, as the proportion of students at risk increased, and the faculty aged considerably, they were strained to keep up and to keep students accountable. Any morning could begin with a student wanting help to find an internship, advice for a problem, or to gush over a success, or to complain. Through any day one teacher could meet with three or four learning groups, visit an intern, grade several students on a field trip, conduct a community meeting, hold private conferences, talk to a parent, write up learning evaluations, organize a special event, grade papers, plan five or six learning meetings for the next day, meet with a graduation committee, and, once in a while, eat lunch in quiet. Students in predictable bunches of thirty were "devoutly to be wished for." When challenges to motivate students at risk began to predominate, the faculty crossed over the line between "energized exploration" to "draining accountability."

The high school teachers who entered the program experienced in lecturing and guiding all-class

discussions found new and very different roles in the Center. In place of lesson planning came "expert" advice to student groups planning a study, conflict resolution, small group facilitation, the evaluation of non-traditional learning experiences. Instead of filling student heads with information "as one would pour milk into an empty glass" (a Carl Rogers statement, circa 1961), they were expected to help students direct inquiries, plan tasks, solve problems, and assess their own learning.

"The concept of self-directed learning sounded wonderful," wrote one teacher in his journal. "In practice, the kids took off at a gallop. I found myself running to catch up and quickly out of breath. Every day was stimulating. Every night collapse." When Center faculty specified the reasons for this "collapse," some attributed their burnout to having the will, not the way. The same journal entry continued, "Old structures were gone. We each had to learn how to *support* and facilitate each student as she struggled to master the process. We were learning as much as the students. In these past years, I've learned to appreciate those old structures, but not enough to want them back."

Other faculty pinpoint the add-on roles which were not crucial to the teaching and facilitating roles. Wrote one teacher, "Creating the new program was the most draining experience of my life. Also the most exhilarating. But when we asked for real help, like 'can we attend a workshop on how to lead a group,' there was no response. When our kids were pressured by other faculty to defend the Center, it was our problem. In short, we had kept the advertised teacher-student ratio, but we were nowhere near the advertised ten-to-one faculty ratio. There were no auxiliary services we could count on. In the latter years of the Center, the administration cut us loose, they had made the whole program self-directed." Another wrote, "When we started I thought we were a small ship in a big fleet. Now I know we are just a small ship alone in a big ocean."

SOME INTERESTING QUESTIONS

In retrospect, the Center's creation and demise raises a number of interesting questions about the change process.

- What if the changes had been systematic?
- What help would technology have provided?
- What staff development might have helped?
- What lessons from the Center apply today?

Systemic Change

The nebulous notion of systemic change raises many questions. If systemic change springs from a common value system that all in the community agree upon, some argue, the only systemic change possible is at the national level, giving a national curriculum, national tests, national norms, national directives. Given the traditional loose structure of American schools, opponents of the national system question its possible effectiveness. "If," they ask, "it is the single school that is the unit of change, then how we can cure that school's systemic ills, at least in the short run?"

Clearly, the Center would have fared better if the school administration had been prepared to defend unwarranted criticisms of the Center; study the success elements; and plan how those success elements could improve the Center or could translate to other changes beneficial to the "parent school." Instead, by its weak support, the administration let the Center, with an overextended and understaffed faculty, bear the brunt of projecting the Center into what a more systems-oriented response would have considered the mainstream.

Technology

The Center predated computers in the schoolhouse. The closest Center faculty came to technology was in facilitating several student projects at Northwestern University. Clearly, a single PC would have been a boon in simple Center management tasks, such as scheduling; keeping attendance; tracking completion of state requirements; managing the massive information students created for their contracts; storing records, and so forth. Beyond that, spreadsheets and databases would have provided tools for faculty and students in designing and teaching projects and keeping track of individual student progress toward self-directed learning. With word processing, faculty and students could have shortened the time taken to

hand write, collate and cross reference the written evaluations. For academic work, the Center was well postured to use mathematics, science, and other software to tailor individual or small group study, but lacked the equipment.

Staff Development

When Center faculty talked about "the will but not the way," they referred primarily to having to reinvent the wheel from their own prior and limited knowledge. Formal staff development was a non-entity in the district. The superintendent told new hires, "We've selected you from more than 250 candidates. Your classroom is your sanctuary." Since faculty in the regular program, with its emphasis on "pouring content into students," fared well without staff development, the same was expected of those in the alternative school with its emphasis on "making meaning."

It is also important to note that Center faculty found themselves needing help where few resources existed. Roger and David Johnson were just making known their research on cooperative learning; Hilda Taba was pioneering her work on concept development, and Sidney Simon and Howie Kirschenbaum were introducing the values clarification model. Little else of practical substance was available.

To fill this gap, the Center faculty invented solutions to new instructional challenges out of its desperation and intuition. One afternoon per week, they met to identify and solve day to day instructional problems. They devoted some sessions to sharing ideas on instruction for small groups, others to facilitation and inquiry. On a second afternoon, they met for three hours to assess student progress and give ideas to help those students who were struggling with self-direction. In the summer, they searched out courses and workshops which might give new insights. More often than not, they found answers outside schools of education.

Although the Center faculty's staff development was unsupported, it demonstrated many of the best practices supported by research today. Their self-directed inservice was focused on their own needs to improve instruction, structured time to share

among themselves successful approaches to instruction, such as how to solve problems collaboratively, and how to coach each other's applications.

Could more formalized staff development have helped? Because the faculty was so closely knit in its thinking, most felt it would have saved time and energy to have more ideas from "experts" outside the Center framework. "After a while," said one facilitator, "we felt we were recycling experts. Our creativity needed some new jolts. We didn't have the time or the expertise to find those minds." At least one Center facilitator wanted more specific help. "I was working with students in many new ways. Even though my old teaching techniques were insufficient, I had lots of enthusiasm. What I needed was some practical help as a counselor, a group leader, a questioner. We reinvented the wheel too much."

APPLICATION LESSONS

The Center was an innovative design before its time. From its short history, we can learn a number of critical lessons about successful and unsuccessful new school design factors. Preeminent among these factors would be the need for systemic, not piecemeal change.

No issue highlights this need for systemic change more than the current achievement gap. While state and national bureaucrats concern themselves with BandAids for declining test scores, mainstreaming goals, multi-cultural issues, classroom teachers struggle with a wider and wider variance of children in their classrooms. As school leaders advertise "learning success for all children," more and more teachers not only wonder about the increasing number of students three to seven years below grade level, they are perplexed by the four students who speak four languages other than English, a wheel chair-bound child who needs tracheal attendance, two MMI students, a behavior-disordered child, a chronic truant, and a child covered with a new set of bruises each morning all in one classroom. The teachers do not question the reasons these students are in the classroom. What they do question is how they are going to ensure that

each child learns what the increasingly overstuffed curriculum and increasing number of pen and pencil standardized tests require. From the federal government comes the command to mainstream and the promise of another standardized test. From the State education department comes the demand to teach reading x number of minutes per day, to cover x, y, and z skills, and to celebrate bird day—with the promise of more state tests. From the district comes the order to individualize instruction for each child and the district tests. After a while, the teacher loses count of the new commands, each with its defensible rationale, but each contradicting some other mandate, to fix a piece of how schooling “ought” to work and to give more days to test more isolated bits of learning. Where, wonders the teacher, does one fix-up blend with the other reforms into an organized, connected and sensible system? With this question unanswered, the teacher, confused and disheartened, stumbles through a patchwork of conflicting requirements, wanting to help each child but, in reality, trapped into contributing to the growing achievement gap. No single teacher, no matter how talented or committed, has the power or skill to make the substantive and systemic changes which will bring their schools into the 21st century.

What will work? At this point in history, it is clear that patchwork reform to fix up an outdated system is not the answer. What is needed is a rethinking and redesign that will reshape schools in a fundamental way for the high tech, high thought, high challenge world of the 21st century. That fundamental, systemic redesign must consider these factors:

- Elimination of conflicting bureaucratic mandates, which, however well intentioned or needed, can only glue together outdated practices based on out-of-date assumptions about learning and teaching.

- Provision of adequate, well conceived staff development programs which will enable experienced teachers to understand what current research is discovering about complex learning; to develop the skills to deliver that learning; to use electronic technology to organize curricula for the success of each unique learner; and to eliminate out of date curriculum and develop instructional programs suitable for the 21st century.
- Provision of time so that teacher teams in each school can consider the growing number of special needs of an increasingly diverse population and fit instruction to those needs.
- The involvement of parents and community agencies in providing meaningful collaboration within the school system.

Change in organizations depends on individual willingness to grow and develop. Mandates restrict growth. Organizations that tap interest and individual motivation, while linking individuals into teams with a shared vision and empowering those teams to create the new system will grow in the next century as true learning communities.

To design successful schools, which can guarantee every child—no matter what her gifts or what her limits—valuable learning each day of her school life, is a challenge of monumental impact. The tools exist. The ideas exist. As the Center “pioneers” and hundreds of teachers like them demonstrated, the spirit and willingness is strong. What must be equally strong is the social commitment to supply educators with the time, training, technology, and true support to *substantively* change a creaking and groaning school system whose current best use may be as a show in the Museum of Ancient History.

REFERENCES

- Beyer, B. (1987). *Developing a thinking skills program*. Boston: Allyn & Bacon.
- Brownlie, F., Close, S., & Wingren, L. (1988). *Reaching for higher thought*. Edmonton, AB: Arnold Publishing, Ltd.
- Fogarty, R. (1991). *How to integrate the curricula*. Palatine, IL: Skylight Publishing.
- Fogarty, R., Perkins, D., & Barell, J. (1991). *How to teach for transfer*. Palatine, IL: Skylight Publishing.
- Glasser, W. G. (1986). *Control theory in the classroom*. New York: Harper & Row.
- Graves, D. H. (1991). *Build a literate classroom*. Portsmouth, NH: Heinemann.
- Johnson, D. W. & Johnson, R. T. (1989). *Leading the cooperative school*. Edina, MN: Interaction Book Company.
- Johnson, D. W., & Johnson, R. T. (1986). *Circles of learning: Cooperation in the classroom*. Edina, MN: Interaction Book Company.
- Sharan, S., & Sharan, Y. (1976). *Small-group teaching*. Englewood Cliffs, NJ: Educational Technology Publications.
- Simon, S. B., & Kirschenbaum, H. (Eds.). (1973). *Readings in values clarification*. Minneapolis: Winston Press.
- Slavin, R., Sharan, S., Kagan, S., Hertz-Lazarowitz, R., Webb, C., & Schmuck, R. (1985). *Learning to cooperate, cooperating to learn*. New York: Plenum Press.
- Stanish, B., & Eberle, B. (1984). *Be a problem solver*. East Aurora, NY: D.O.K. Publishers.

SECTION THREE

LEARNING FOR A LIFETIME

"I'm so pleased with my children," beamed Mrs. Simmons, a veteran kindergarten teacher with twenty years of experience. "This year's class got the idea sooner than any I've taught."

"Do you mean they can put on their boots already?" one amazed colleague asked.

"No, no," laughed Mrs. Simmons. "That won't happen for another month or two."

"What then?" puzzled her friend.

"Life long learning."

"Life long learning? Why you're pulling my leg. Not in kindergarten."

"Oh, yes," beamed Mrs. Simmons. "We just came in from the playground. I asked the class how they had enjoyed duck-duck goose. Erik put up his hand and do you know what he said?"

"No."

"He said he was wondering how playing duck-duck goose would help him in real life. Don't you think that's amazing that these youngsters are already thinking about how they can use what they're learning?"

This final section brings the opening premise of schooling full circle: Learning is a for a lifetime. As we educators envision the schools of the 21st century, we must pay particular attention to the concept of learning for a lifetime; we must plan for meaningful learning and we must explicitly incorporate curricular and instructional elements that foster creative transfer.

While the two previous sections examine the purpose and vision of the future school as well as the concept of restructuring from the inside out, this section extends the image. "Learning For A Lifetime" dictates transformational change for schools; curricular reconceptualization that goes beyond the cognitive and into the metacognitive: the uses, applications and creative transfer of learning become the most significant outcomes.

A discussion of the science and art of transfer by leading theorists begins the section, followed by a piece that delineates a methodology of teaching explicitly for transfer. Moving more directly into the concept of metacognition, several chapters examine self-reflective mind tools that prepare students for strategic problem solving and mindful decision making. In addition, articles in this section implicitly and explicitly target reflective metacognitive behaviors for teachers as well as for students, as they plan, implement, and evaluate the significant goals and outcomes of curriculum and instruction for the schools of the future.

THE SCIENCE AND ART OF TRANSFER

David Perkins and Gavriel Salomon

Both the meaning and the challenge of transferring learning are well expressed in a story told to one of us by a disappointed professor of physics at a nearby college. Among the stock problems explored in the physics course was one like this: "A ball weighing three kilograms is dropped from the top of a tower 100 meters tall. How many seconds does it take to reach the ground?" Aficionados of physics will recognize that the weight of the ball has nothing to do with the problem; it is a distraction. The answer depends only on the acceleration of gravity.

On the final exam, the professor included a problem like this: "There is a 100-meter hole in the ground. A ball weighing three kilograms is rolled off the side into the hole. How long does it take to reach the bottom?"

Some students did not recognize the connection between the "tower" problem and the "hole" problem. One student even came up after the exam and accosted the professor with a complaint. "I think this exam was unfair," the student wailed. "We never had any *hole* problems!"

Two points become plain from this anecdote. First of all, it tells us what transfer means. The term *transfer* refers to a phenomenon in which some-

thing learned in one situation is carried over to another—in this case, from the context of "tower" problems to the context of "hole" problems. Second, the anecdote warns us that all is not well with transfer. Very often in instructional settings—and in everyday life—we do not get the transfer we want. Learners acquire skills and knowledge in one situation, but fail to make connections to other situations in which those skills and knowledge would prove valuable.

If transfer does not occur as frequently as we would like, then this poses a major problem for education. After all, the entire enterprise of formal education depends on transfer. We do not teach students arithmetic in school so they can apply it on school quizzes and exams. We want them to put arithmetic to work in the world, making wise purchases in the supermarket, understanding their mortgages, keeping track of household expenses, and of course, entering careers in which arithmetic and more complex kinds of mathematics play key roles. We do not teach students history in school so they can pass the exam at the end of the term. Rather, we want them to understand the world they live in from an historical perspective. We want the newspaper headlines to make sense in comparison

and contrast with the past. We do not teach students reading and writing in schools so they can go to the encyclopedia and produce schoolish essays to satisfy the teacher. We want them to be intelligent readers and practical, effective writers throughout their lives.

These routine ambitions of education all ask that learners apply outside of school what they learn in school. Even within the walls of the school, transfer has value. Students need in science classes what they learn in mathematics classes. They need in history classes the writing and reading skills they acquire in English class. All this depends on transfer of learning. If transfer of learning is at risk, much of the point and process of schooling is at risk as well.

WHAT IS TRANSFER OF LEARNING?

While the remarks to this point give a broad sense of the meaning of transfer, it is worthwhile to frame the concept a little more carefully. The concept of transfer basically comes from the psychological literature on learning theory. It means, as we said before, the use of knowledge or skills acquired in one context in another (Cromier & Hagman, 1987; Royer, 1979; Salomon & Perkins, 1989).

One important, albeit rough, contrast concerns *near transfer* versus *far transfer*. Near transfer occurs when knowledge or skill is used in situations very like the initial context of learning. For instance, transfer from the tower problem to the hole problem certainly would count as near transfer. Far transfer occurs when people make connections to contexts that intuitively seem vastly different from the context of learning. For example, a friend of one of ours, out on a cheese-and-wine picnic, found himself without a knife to cut the cheese. Instead he used a credit card. He transferred his knowledge of the characteristics of a credit card—stiff, thin—to an application in a radically different context (Perkins, 1990).

It must be admitted that the near-far contrast is very fuzzy. Psychology has failed to articulate a good yardstick to quantify the "distance" from context to context, and indeed there are fundamental reasons to believe that any precise yardstick is im-

possible (Salomon & Perkins, 1989). Nonetheless, the contrast proves useful in broad talk about transfer, particularly because it is far transfer that proves hardest to come by. Yet, far transfer is of special concern to education, since many of the settings in which we would like youngsters to apply what they learn in school are not very much like the classrooms in which students initially learn.

Another important contrast in the literature on transfer concerns *positive* and *negative* transfer. So far, our examples have emphasized positive cases. But transfer of learning can do mischief as well as good. For example, if you have acquired your driving habits in the United States and rent a car in England on holiday, where folks drive on the left rather than on the right, you will find yourself constantly fighting a disastrous "drive-on-the-right" impulse—negative transfer. In learning a foreign language, many students carry over from their original language syntactic patterns that do not fit—another case of negative transfer. While the phenomenon of negative transfer is very real and important, on the whole it is much less pressing than the absence of positive transfer in the many cases where we want it. Accordingly, we will focus on positive transfer here.

A final, crucial contrast concerns *transfer* and plain old *learning*. Arguably, even minimal learning entails transfer in some sense. If, for example, Doris learns an arithmetic fact in classroom 13a, we would expect her to be able to remember it in classroom 13b, despite the fact that the physical arrangement of this room—its furniture, lighting, and wall paper—is quite different from room 13a. Otherwise, we would say she had not really learned it in the first place. Yet this is transfer of a sort—from classroom 13a to 13b. So where should we draw the line between plain old learning and "real" transfer?

The distinction here is admittedly fuzzy, much like the distinction between near transfer and far transfer. However, the spirit of the contrast is clear enough. Psychologists speak of transfer of learning when the learner has learned something within a limited range of contexts, but whether this learning is carried to other contexts is at risk. In other words, transfer begins where minimal learning

ends. Another way to make the point would be to extend the near-far contrast to speak of very near transfer, near transfer, and far transfer. Very near transfer is simply normal learning. Given normal learning, then comes the question of whether we see near transfer or even far transfer. Regrettably, often we do not.

THE SCIENCE OF TRANSFER

Readers may have noticed an oddity in our title. Usually, one speaks of the "art and science" of something, whereas we refer to the "science and art" of transfer. This is no accident. In the case of transfer, at least, a science is very much needed to drive the art.

Historically, transfer has been a concern of educational psychologists. However, it has not so much occupied the attention of practitioners, and the science of transfer itself has taken some odd turns. To meet the challenge of teaching for transfer, it is worth understanding better what theories of transfer we might hold and which of these theories capture the phenomenon best. In fact, to lighten the tone a little, we write about three views of transfer—the Bo Peep theory, the Lost Sheep theory, and the Good Shepherd theory. Each has a contribution to make to understanding when and why transfer happens and how to encourage it to happen more often.

The Bo Peep Theory

The "Bo Peep theory" of transfer is the default theory of educational practice. Year in, year out, we teach as though transfer takes care of itself. Youngsters study arithmetic in mathematics class, reading and writing in English, history and social patterns in social studies, and so on, with the expectation that they will more or less automatically carry what they learn to other appropriate contexts in school and out. Nothing special is done to see that this happens. It is simply supposed to happen.

One might call this the Bo Peep theory of transfer, recalling a couple of lines from the well-known children's rhyme: "Leave them alone and they'll come home/wagging their tails behind them." As with Bo Peep's lost sheep, the Bo Peep theory of

transfer assumes that knowledge and skills a person has learned will "come home" to wherever it is needed. Just leave it alone. No problem.

Who espouses the Bo Peep theory? No one, of course. It is a tacit theory, not articulated, but implicit in the way we behave in the classroom. It is not that anyone advocates that transfer takes care of itself. Rather, everyday practice presumes that this happens. Unfortunately, the lesson of more carefully scrutinized experience and of considerable psychological research is that transfer very often does not occur spontaneously.

The classic contribution of the psychological laboratory to this argument comes from the early educational psychologist E. L. Thorndike. Thorndike first studied the transfer effects of specific activities such as crossing out a particular letter on a page and one's ability to cross out another letter on another page. Later on, testing the idea that specific subject areas such as Latin and geometry cultivate the mind's faculties, he compared the curricular areas of literally thousands of students. In this way, Thorndike could examine the extent to which any one curricular combination affected students' abilities as compared with another curricular combination.

Thorndike's research led him to conclude that no transfer from one area to another takes place unless the two areas share a number of important common elements. The implication is that learning is highly specific. "Training the mind means the development of thousands of particular independent capacities" (Thorndike, 1906, p. 246). Considerable research since Thorndike's day has encouraged the same view. Very commonly, transfer does not occur in the absence of blatant similarities between the originally learned task and the transfer task (Pea & Kurland, 1984a, b; Scribner & Cole, 1981; Simon & Hayes, 1977).

The Lost Sheep Theory

As the studies just mentioned show, transfer simply does not occur often. What to make of this? One reaction of the psychological community has incorporated a line of research into what is commonly called *expertise*, the nature of experts' skill in a domain such as physics, painting, or the stock market.

The general tenor of this research shows that each domain involves considerable "local knowledge"—that is, knowledge quite specific to the particular character of the domain. Knowledge and skill from other domains simply do not inform skilled performance in a separate domain to any great extent—so, at least, several investigators have concluded. Combining these investigations with the poor showing of transfer, some psychologists have decided that we do not see the transfer we want simply because the prospects for transfer are poor. Knowledge acquired in one context does not apply that powerfully in other contexts. There is little useful transfer to be had. One might call this viewpoint the "Lost Sheep theory" of transfer. It says that, in effect, rich, far-reaching transfer is a lost cause. One cannot expect to secure very much of it.

Strong implications follow for the design of educational practice. If we believe the Lost Sheep theory, we should more or less give up on the agenda of transfer, particularly far transfer. We should shape education to teach in carefully targeted ways, specifically to the performances we want. We should beware of the notion of generally equipping learners with widely applicable knowledge and skill. Instead, we should identify very particular performance targets and adjust education to serve them.

However, is the lost sheep theory correct? Perhaps not. A number of findings have emerged that cast doubt on the lost sheep theory. Consider a few examples. Lehman, Lempert, and Nisbett (1988) found that students who attended graduate programs in psychology or medicine—but not chemistry—produced impressive transfer effects with respect to their ability to reason statistically and to think conditionally.

Palincsar and Brown (1984) taught seventh grade poor readers four self-guidance reading comprehension strategies—questioning, clarifying, summarizing, and predicting—through a means that they term "reciprocal teaching." In the reciprocal teaching setting, students take turns in leading their peers in the use of these strategies during reading, initially with strong leadership from the teacher. Reciprocal teaching of these strategies not only improved reading comprehen-

sion, but it also improved students' performances in other domains, including the learning of science and social studies. These results suggest far transfer of the self-guidance ability cultivated during reciprocal teaching.

Salomon, Globerson, and Guterman (1989) found similar transfer effects from reading with a computerized reading partner that provided expertlike advice on writing. It appeared that the seventh grade students in that study internalized the guidance provided by the computer tool. They came to use it as self-guidance in a far-transfer task—writing.

The Good Shepherd Theory of Transfer

As the foregoing findings—and others too—show, the prospects of transfer are oddly mixed. The Bo Peep theory is wrong: we cannot simply expect that the "sheep will come home" routinely. On the other hand, the lost sheep theory appears to be mistaken too: sometimes considerable transfer occurs, even far transfer. What to make of this peculiar melange of findings?

Some help comes from a model of transfer recently proposed by your authors, Gavriel Salomon and David Perkins. Salomon and Perkins articulated a *high-road, low-road* model of transfer to explain the complicated pattern of findings. According to their model, transfer occurs in two very different ways, through the high-road mechanism or the low-road mechanism (Perkins and Salomon, 1988; Salomon and Perkins, 1989). Transfer appears only when the conditions activate one or the other mechanism. Findings on transfer are mixed because some educational settings activate one or the other of these mechanisms, whereas many educational settings activate neither one.

We will sketch the high-road low-road model shortly, but it is worth drawing the moral in advance. We cannot expect education to yield much transfer unless it activates the mechanisms of transfer. Accordingly, teachers, textbook writers, and others need to work to "shepherd" transfer. We need to be proactive about establishing the conditions in the classroom that favor transfer of learning. If we do not, we will miss much of the transfer we want—the sheep will get lost. Thus, we

can speak of the "Good Shepherd theory" of transfer, which says the desired transfer can occur only if we are good shepherds and help it along.

Now let us see what this high-road low-road theory of transfer is like. Consider two cases. In the first case, a friend of your son comes to visit for a few days while his parents are away. Used to reminding your son to pick up after himself, you treat the friend the same way. The friend proves responsive and the house stays neat. Only afterward do you note that you behaved more or less automatically: "a kid is a kid." Your behavior transferred from your son to the visitor.

In the second case, you face a problem. The more you urge your son to do his homework, the less he does. You wonder and search for an explanation and solution. Your search suggests to you a principle you learned in another context—that is, under some conditions, a perfectly reasonable solution to a problem may end up exacerbating it. You decide this applies to your case. Just maybe your son will become more involved in homework if you leave it to him rather than pester him. You try it and find—in this case at least—it works. Your son starts tackling his homework with more of a will.

Both cases illustrate transfer. But the processes underlying the two are clearly different. In the first case, transfer of a well-mastered skill appears to take care of itself when an appropriate situation is encountered. It happens automatically. We call this the *low road to transfer*. It is based on a skill mastered by continuous and repeated practice. The skill is applied to a new situation that is very similar to the situations in which it has been practiced in the past. No far transfer takes place via the low road, but the transfer that does take place is easy and automatic. Sometimes it is even too automatic. For example, your tendency to drive on the right in London, despite your knowledge that the right is the wrong side, is an example of low-road negative transfer.

Contrast this automatic application of a well-practiced skill, typical to low-road transfer, with the second case. Nothing was automatic there. On the contrary, you had to engage in an effortful, deliberate search of your memory to come up with a reasonable answer to your family problem. More-

over, the idea you arrived at was not a well-rehearsed low-level one; it was a rather general and abstract principle that you must have heard or formulated for yourself a while ago. Originally, you may have encountered this principle in the context of crime and imprisonment. But once abstracted and freed from its original context, the principle, "solutions can exacerbate the problems they are designed to solve," becomes available for far and wide application. Transfer to new situations is not easy and it does not happen on its own; it requires the mindful abstraction of a principle, the effortful search in one's memory, the selection of the appropriate principle, and, finally, its application to a new instance. Thus, we call it *high-road transfer*. The cases we have briefly described—the study of transfer from graduate studies, and the transfer of self-guidance in the Palincsar and Brown and in the Salomon, Globerson, and Guterman studies—were all cases of high-road transfer.

THE ART OF TRANSFER

The advancing science of transfer paints a more hopeful picture than either the tacit Bo Peep theory or the pessimistic Lost Sheep theory offers. We can have transfer, it seems, if only we will be good shepherds of it. But what is the art of shepherding transfer like? How can classroom teachers take advantage of the high-road and low-road transfer mechanisms to teach for transfer?

Actually, it is not too difficult to translate the high-road and low-road mechanisms into some practical advice concerning teaching for transfer. One can speak to two broad categories of classroom practice corresponding to the two mechanisms: *bridging* for high-road transfer and *hugging* for low-road transfer (Perkins & Salomon, 1988). Let us look at each.

Teaching for Transfer by Bridging

In keeping with its name, *bridging* means the teacher helps the students build a bridge from the context of learning to other contexts of potential application. What this might mean is best seen through examples.

Imagine, for instance, a biology teacher discussing the circulatory system with students. After exploring the circulatory system in a fairly traditional way, the teacher, aware of the problem of transfer, decides to provoke a wide-ranging examination of circulatory systems in general.

TEACHER: We've been focusing on the human circulatory system. Let's see whether we can think of some other circulatory systems. Where else besides in the human body do things circulate?

STUDENTS: (No response.)

TEACHER: Well, for example, do things circulate in your home or around a city? (With the stimulus of this follow-up question, the students begin to make connections.)

VARIOUS STUDENTS: There's plumbing in your home. There's electricity. Cars circulate around a city. And buses. And oil pipelines carry oil around.

TEACHER: Yes, those all make sense. (The teacher lists the examples on the blackboard.) Let's do a quick comparison and contrast for some of these. Take the plumbing in your house, for example. What's a key similarity and a key difference with the human circulatory system?

STUDENT: In the plumbing, a key similarity is it's liquid, and it's used, and the waste is excreted—sent to the sewers.

STUDENT: A key difference is that it's not oxygen or nourishment that gets delivered. It's water itself.

The teacher continues with the discussion, drawing out a number of key differences and similarities with various circulatory systems. Then the teacher seeks to consolidate the experience by extracting some key insights about circulatory systems in general.

TEACHER: Let's stand back and see what we're learning from this. What's common to all or most of the circulatory systems we've looked at?

STUDENT: Well, one thing is that things tend to go in one direction, except for two-way streets. It's pretty much one-way flow.

TEACHER: And why is that?

STUDENT: I guess it's because otherwise the flow wouldn't be very smooth. That's why we have one-way streets, and why we have to drive on one side even when streets are two-way, come to think of it. And how can water or blood or anything flow two ways in the same pipe? Well, maybe it could for a little bit, but not much really.

The teacher continues to discuss the example with the students, extracting a few more fundamental features of circulatory systems. Pleased with the far-ranging discussion, the teacher sees two gains. On the one hand, the students have gotten at something far more general than the original topic of the circulatory system itself. On the other, they appreciate better the basic "logic" of the human circulatory system, how it has certain design characteristics fundamental to any circulatory system.

This is just one example of bridging. The teacher's questions, calling for analogies and the reasons for them, provoke students to build conceptual bridges between one area—the human circulatory system—and others. Notice how the teacher's questions depend on the high-road mechanism of transfer. They demand of the students mindful abstraction from the case at hand, rather than the automatic match-making characteristic of low-road transfer.

Of course, this example illustrates just one way in which teachers can bridge. Here are a few other bridging patterns:

- In introducing a new topic, the teacher can establish a mindset for transfer by asking students to brainstorm how what they learn from the new topic might apply elsewhere.
- After studying a particular topic, the teacher can guide students in a close exploration of an analogy to explore in detail its similarities and differences and the underlying reasons for them. For instance, the human circulatory system could be compared in detail with that of a frog.
- The teacher can encourage students to be metacognitive about their approach to solving problems. They can take a minute before tack-

ling a problem to ask what advice they would give themselves about how to approach it. Then, they can take a minute to ask how the advice worked and how they would change it for next time. Research shows that metacognition—thinking about your thinking—fosters transfer.

In general, the ultimate art in teaching for transfer consists in helping students catch the spirit and craft of transfer for themselves. The teacher does not have to keep reminding them. Once their minds are set for transfer, they will spontaneously begin to look for the connections that earlier had to be provoked.

Teaching for Transfer by Hugging

Of course, bridging exercises just one of the mechanisms of transfer, the high road. How about the low-road mechanism? For this, we adopt the label *hugging*. The general idea of hugging is to make the learning situation more like the situations to which transfer is desired. Then the automatic responses will frequently occur.

Again, an example serves best to convey the spirit of hugging. All school children learn about writing paragraphs with good topic sentences. But what kind of practice do students receive? Actually, rather different kinds depending on the text. For instance, children may be asked to scan a list of sentences, marking which ones seem like topic sentences and which ones seem like supporting sentences. Children may be asked to review a page full of paragraphs, circling the topic sentences in each paragraph.

Such exercises, no doubt, have some utility. But they do not go far enough. While the instruction aims to empower students to write better, these activities do not involve any actual writing! In other words, the practice does not hug closely to the desired performance.

How might we provide practice that more directly engages students in writing paragraphs with topic sentences? There are a number of ways. For example, the teacher might hand out slips of paper that ask each student to write a paragraph with a topic sentence. Some students are to place their

topic sentences near the end of the paragraph and some near the beginning, just as the textbook allows. After composing their paragraphs, students exchange their work with a neighbor. Can the neighbor circle the topic sentence in the paragraph? If not, either the author has not written a very conspicuous topic sentence, or the neighbor has not caught on to the idea of topic sentences. This kind of activity provides practice in both discriminating and composing topic sentences.

Regrettably, learning about topic sentences without actually writing any signifies a pattern that recurs all too often in schools. That is, instruction aims at certain performances, but students do not actually engage in the performances desired nor anything like them. A classic example concerns many physics and chemistry laboratory exercises. Such experiences aim in part to give students the flavor of functioning as a scientist. But most laboratory exercises for school involve following prescribed recipes. They do not allow students to make exploratory hypotheses or to invent ways to test hypotheses—both of which are characteristic of real experimental inquiry. It is not so difficult to design laboratory experiences that do exactly this—that hug closer to the experience of authentic scientific inquiry.

Just as in the case of bridging, there are a number of different strategies for fostering transfer by hugging. Here are a few more:

- Simulation games allow students to experience what it is like to be involved in complex patterns of social interaction. For example, students can be assigned different roles in a racial or union-management dispute.
- Problem-based learning is a pattern of learning that, according to research, fosters transfer. Here, students learn a body of content not didactically, but rather through tackling problems that demand use of the content. They study the content as they need it. This is hugging because knowledge acquired in a problem-solving manner is more available in later problem-solving situations.
- Mental practice is one of the most basic kinds of hugging. When learners cannot physically

engage in an activity, often useful mental practice is possible. For example, in preparing for a job interview, students can imagine what it would be like by making a "mental movie" of what the interviewer might ask and how they might answer. Since a wide range of circumstances invite mental practice, including taking exams, teachers can encourage students to adopt this powerful tactic often.

TOWARD THE CONNECTED CURRICULUM

We have shown how a better understanding of transfer points the way toward instruction that fosters transfer. No more is there an excuse for letting knowledge accumulate in isolated puddles within students' minds. We know how to teach for transfer, not according to the tacit Bo Peep model in which transfer takes care of itself, but according to the Good Shepherd model in which teachers need to be proactive cultivators of the conditions of transfer.

The implications of this understanding reach beyond teaching for transfer as such and into the design of school curricula. To a dismaying extent, education suffers from what might be called a "disconnected curriculum" (Perkins, 1986). The subject matters are taught encapsulated from one another and sealed off from the lives students live

outside of school—not to mention the lives they will live after they complete their schooling. Partly, this is a problem of transfer. But partly, the disconnected curriculum reflects traditions that have become entrenched in educational practice. In particular, a good deal of what youngsters learn does not connect very well to anything else but the class in which it is taught.

A better understanding of the transfer of learning and the conditions that foster it can help us look toward the very opposite of the disconnected curriculum—the "connected curriculum." Teachers, textbook writers, and others concerned with curriculum can make their curricular choices with the potential of transfer in mind. In selecting topics in history, they can ask themselves about the potential connections to current events, science, the workplace, and English. In selecting topics in science, they can ask how such themes are likely to speak to the other subject matters, the activities students are doing after school, and the career directions students are considering.

In general, there is an immense opportunity to consider each subject not only from its own disciplinary perspective, but also from the standpoint of its potential broader import. Because the science and art of transfer tells us how to make the most of the import, the potential of the connected curriculum is at hand.

REFERENCES

- Cromier, S. M., & Hagman, J. D. (Eds.) (1987). *Transfer of learning*. New York: Academic Press.
- Lehman, D. R., Lempert, R. O., & Nisbett, R. E. (1988). The effects of graduate training on reasoning: Formal discipline and thinking about everyday-life events. *American Psychologist*, 43, 431-442.
- Palincsar, A. S., & Brown, A. L. (1984). Reciprocal teaching of comprehension-fostering and comprehension-monitoring activities. *Cognition and Instruction*, 1, 117-175.
- Pea, R. D., & Kurland, D. M. (1984a). *Logo programming and the development of planning skills* (Report no. 16). New York: Bank Street College.
- Pea, R. D., & Kurland, D. M. (1984b). On the cognitive effects of learning computer programming. *New Ideas in Psychology*, 2(2), 137-168.
- Perkins, D. N. (1990). The nature and nurture of creativity. In B. F. Jones & L. Idol (Eds.), *Dimensions of thinking and cognitive instruction*. (pp. 415-444). Hillsdale, NJ: Lawrence Erlbaum.

- Perkins, D. N. (1986). *Knowledge as design*. Hillsdale, NJ: Lawrence Erlbaum.
- Perkins, D. N., & Salomon, G. (1988, September). Teaching for transfer. *Educational Leadership*, 46(1), 22-32.
- Royer, J. M. (1979). Theories of the transfer of learning. *Educational Psychology*, 14, 53-64.
- Salomon, G., Globerson, T., & Guterman, E. (1989). The computer as the zone of proximal development: Internalizing reading-related metacognition from a reading partner. *Journal of Educational Psychology*, 81, 620-627.
- Salomon, G., & Perkins, D.N. (1989). Rocky roads to transfer: Rethinking mechanisms of a neglected phenomenon. *Educational Psychologist*, 24(2), 113-142.
- Scribner, S., & Cole, M. (1981). *The psychology of literacy*. Cambridge, MA: Harvard University Press.
- Simon, H. A., & Hayes, J. R. (1977). Psychological differences among problem isomorphs. In N. J. Castellan, D. B. Pisoni, & G. R. Potts (Eds.), *Cognitive theory* (Vol. 2). Hillsdale, NJ: Erlbaum.
- Thorndike, E. L. (1906). *Principles of teaching*. New York: A. G. Seiler.

TEACHING FOR TRANSFER

Robin Fogarty

All teaching is for transfer. All learning is for transfer. The mission of the thinking classrooms, then, is to extend learning, to bridge the old to the new, and to lead students toward relevant transfer and use across academic content and into life situations.

In our work with teachers in the area of teaching for transfer (Fogarty, Perkins, & Barell, 1991), we have found a simple framework to be helpful. As we explore such questions as, "Why am I teaching this?" "Where is the transfer?" with teachers, we introduce this notion:

There are "SOMETHINGS" that we "SOMEHOW" want to use "SOMEWHERE"

To clarify this less than esoteric statement of transfer, we offer the diagram in Figure 1 to illustrate the "somethings, somehows, and somewheres" inherent in the transfer of learning.

Basically, the diagram illustrates that there are "somethings" that we want to transfer. These include the more obvious things such as content, knowledge and skills as well as the more universal things such as principles, concepts, attitudes and dispositions. As we plan lessons, the identified "somethings" determine the shape of those lessons.

For example, if a targeted "something" is the attitude of cooperation and teamwork, the lesson will need activity components that require collaboration.

Paralleling this attention to the "somethings" of this lesson, another consideration illustrated in Figure 1 is the "somewhere." Exactly where might this "something" transfer? Within the content? Across other subject matter lessons? Or into life situations? Determining the "somewheres" ahead of time, or anticipating future applications, also has an impact on the shape of the lesson.

However, once the "somethings" are sifted out and the "somewheres" consciously targeted, the "somehows" of transfer are the next consideration. The center of the diagram in Figure 1 illustrates the "somehows" or transfer options that are available.

These options include both low road mediation strategies that hug the lesson closely or high road bridging techniques that require thoughtful application. Either way, through simple hugging strategies of setting expectations, modeling, matching, simulations or problem-based learning or through more complex bridging strategies of anticipating applications, parallel problem-solving, generalizing

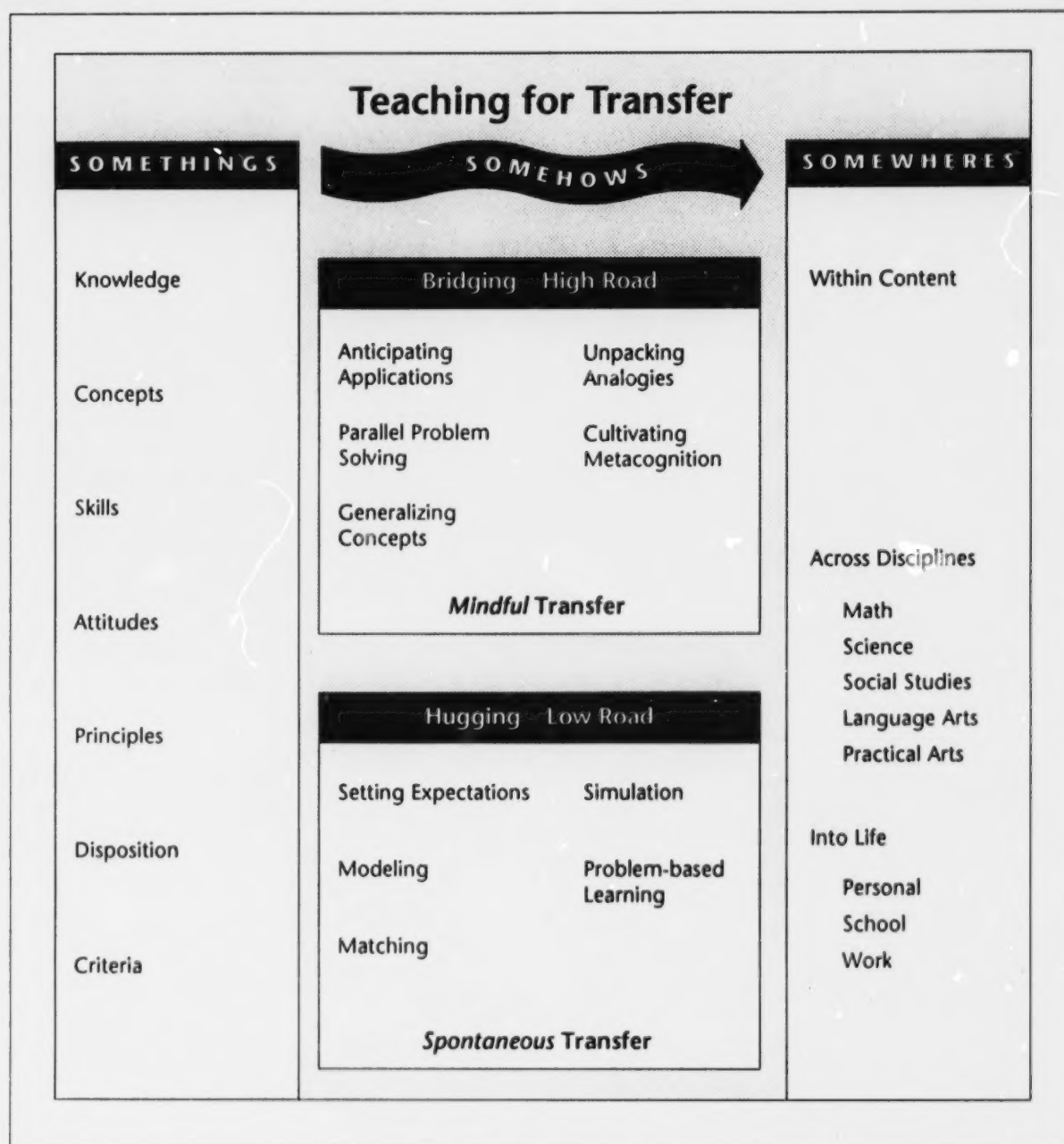


Figure 1

concepts, analyzing analogies and cultivating metacognition, explicit mediation fosters the transfer of learning.

The primary focus of this chapter is to describe and illustrate the practical aspects of how to teach for transfer. Therefore, the emphasis is on the

"somehows" or mediation strategies of transfer. However, in order to present a truly practical model of teaching for transfer, some attention must be given to ways of finding the "some-things" worth teaching and ways to target the "somewheres."

FINDING THE "SOMETHINGS" TO TRANSFER

"Something" Vignette

[Scenario #1: Prior to a lesson introducing the Periodic Table of Elements, the teacher deliberately looks for the "somethings" worth teaching to make explicit the relevance to students for later transfer.]

PHYSICS TEACHER: (Pointing to a dilapidated and yellowed Periodic Table of Elements hanging above the black lab table. The chart is framed along the bottom with an uneven fringe of frayed threads.) You will be responsible for knowing the contents of this table. It will serve you well, as you work in this lab.

TIM: (eyes rolling up, thinking to himself, "I'm never gonna use this stuff ever again. What a waste. How am I ever gonna memorize all this?")

PHYSICS TEACHER: Some of you are probably thinking, "When am I ever gonna use this?"

TIM: (Sits up with a start, waiting for the punch line.)

PHYSICS TEACHER: Well, for those of you who are plotting a career using the sciences, it's quite clear that the scientific knowledge contained in the chart will be invaluable to you. But what about those of you who already feel that the sciences will not be a life pursuit. Let's talk a little about how learning this table might benefit you in other ways. Let's look at what might transfer for you besides the science content. Any ideas?

RENEE: I was thinking that maybe the chart itself might serve as a model for gathering information. Grids and matrices are useful tools to organize data. I use them in social studies a lot.

PHYSICS TEACHER: That's pretty insightful. How many of you have used a matrix to sort or depict information? (3 hands go up.) What else?

JOSE: The symbols on the chart remind me of Greek letters and other symbols we use in math. So I guess the idea of decoding symbolic language may be useful in other situations.

PHYSICS TEACHER: Quite so! I agree with you. The use of symbols is something we encounter throughout life. Just look at the international road signs. What else?

ROSA: Probably because I'm so involved in art, but I think the thing that is most interesting—and maybe most universal in terms of future use of this Periodic Table of Elements is the pattern in the chart. There are patterns in everything and these patterns help us understand—and remember things.

TIM: (Now sitting on the edge of his seat.) Yeah—and I've been thinking, too. Just figuring out how these elements are related to each other might help me see connections in other things. Once I find a way to get this in my head, I'll be able to connect lots of things.

PHYSICS TEACHER: I'm amazed at your ingenuity. Great thinking, today. Now, do we agree at least mildly, that this Periodic Table of Elements is worth my teaching and worth your learning?

SOMETHINGS:	
	lesson/unit/topic
Knowledge:	information, facts, data (e.g., definitions, dates, statistics)
Skill:	social, thinking, organizational (e.g., cooperation, prediction, ranking)
Concept:	domain specific; universal (e.g., photosynthesis, courage)
Attitude:	feelings, tone (e.g., inadequacy, optimism)
Principle:	rules, laws, theorems (e.g., 2nd Law of Thermodynamics; Pythagorean Theorem)
Disposition:	Behaviors, habits, tendencies (e.g., impulsivity, procedural, humorous)

Figure 2

Targeting the Somethings

Scenario #1 illustrates that sorting out the "somethings" worth teaching is a crucial first step for teaching for transfer. In fact, there are three distinct reasons why teachers need to take the time to target the "somethings." As never-ending curriculum demands burden the already overloaded schedules, teachers find it more and more necessary to sift out the real meat of the curriculum and set curricular priorities. However, in addition to this selection process as a survival tactic, the trend toward more holistic curriculum models of instruction also dictates the need to scrutinize the curriculum for integrating threads. And finally, as illustrated in the scenario, there is a compelling need to emphasize the pieces that have real "transfer power," so students can see their relevance.

We can only teach so much. Our time and resources are limited. Yet, we want our students to learn in natural and holistic ways. And of course, we expect them to transfer that learning with ease and frequency. To uncover the sources within our curriculum that provide fertile ground for relevant student transfer, Costa (1991a) says, we must "selectively abandon" and "judiciously include" curricular components. It is the work of the skilled teacher to find the "somethings" worth teaching.

To become good at searching out the somethings, a general framework such as the one illustrated in Figure 2 is used. The framework in Figure 2 is a guide to use to look for particular knowledge pieces, skills, concepts, attitudes, principles, and dispositions to emphasize explicitly in the lesson for deliberate transfer later. That is to say that each is examined for possible "transfer power." By sifting the content through this framework, the real curricular priorities can be sorted out quite easily as the teacher weighs the results against the district philosophy, academic criteria, and student relevance.

For example, as the teacher examines a unit on the digestive system, a completed frame might look like the one in Figure 3. Note the memos on the right side of the chart, which record the teacher's thoughts about how to approach this unit and get the most transfer power from it.

This process of searching for the "somethings" worth teaching can be done quite painlessly after a few practices. Of course, many of us already do this sort of analysis in our heads as we look at upcoming units. However, the point is to make the process of setting curriculum priorities a deliberate and systematic procedure that precedes the instructional activity in the classroom.

FINDING THE "SOMETHINGS": Digestive System	
FIRST PASS	SECOND THOUGHTS
Digestive System Search for "somethings"	<i>Maybe I should expand the topic to systems in the body or "Your Inner Environment"</i>
<i>Knowledge:</i> human anatomy vocabulary, digestive system per se <i>Skills:</i> diagrams, flow charts, sequencing, use of analogies <i>Concepts:</i> digestive system, systems, loops, assimilation, environment <i>Attitude:</i> value good health, nutritious diet <i>Principles:</i> cause/effect <i>Dispositions:</i> awareness of bodily functions. Whole health and fitness point of view.	<i>The text is the best resource here, but will need some library time.</i> <i>I need to target one major thinking skill—maybe sequencing; can use graphic organizers to illustrate and utilize skill. Using analogies is a possible way to culminate unit.</i> <i>Systems is the universal concept but I like the idea of "inner environment"—then I could do health, nutrition, substance abuse prevention, and self-esteem—fertile themes.</i> <i>This would fit with the expanded concept idea.</i> <i>Cause and effect could also be the thinking skill focus; more sophisticated than sequencing.</i> <i>Like the idea of connecting this to health/fitness focus.</i>
"SOMETHINGS" WITH TRANSFER POTENTIAL • Inner Environment or systems • Cause/Effect • Self-Esteem <i>NOTE: Use graphic organizers: flow chart, cause-effect circles, decision tree.</i>	

Figure 3

Once we begin this conversation of "What's worth teaching?" and "Where is the transfer power in this content piece?" we can use it to examine past units of study as well. Sometimes it is easier to look back at a lesson or unit just completed and sift out the priority pieces for the next time. Or, it may be

easier to work through the priorities in professional dialogue with colleagues.

As a pre-planning strategy or as an evaluation tool, setting curricular priorities—finding the "somethings worth teaching"—must guide the instructional acts in our schools.

SOMEHOWS

"Somehow" Vignette

[Scenario #2: Using the history chapter on the causes of World War II as the content target, the history teacher also targets the skill of asking good questions as part of the lesson focus. The specific type of questioning that is targeted is metacognitive reflection questions. This scenario illustrates how a history teacher uses "a bridging strategy" to facilitate meaningful transfer.]

HISTORY TEACHER: Your assignment involves two parts. Part I: Review the questions at the back of the chapter, and with a partner, categorize them as either "Skinny" questions that can be answered directly from the text reading or as "Fat" questions that go beyond the given information.

MEUSSA: Question? Can you give us examples.

HISTORY TEACHER: Better yet, let me pose a question. You value it, "fat" or "skinny". Here's one. What were significant battles of World War II?"

MEUSSA: That seems pretty narrow. I think it's a skinny question.

HISTORY TEACHER: How about this? Define one of the following statements: Great men make great events or Great events make great men.

MEUSSA: Definitely a "fat" question. I would have to give lots of supporting evidence—it would turn into a long answer.

HISTORY TEACHER: That's right! You've got the idea. Now, Part II of the assignment (I didn't forget!) is to select questions from your list and write your answers to turn in.

ANDREW: (hand waving in the air)

HISTORY TEACHER: Will this be a fat or skinny question, Andrew?

ANDREW: Skinny!

HISTORY TEACHER: OK, what's your question?

ANDREW: How many questions should we answer?

HISTORY TEACHER: You're right—It is skinny. The answer is four! Write answers to two fat and two skinny questions.

The "Somehows" of Transfer

While the search for the "somethings" in our curricular content is of primary concern in the instructional process, the main focus of this essay is to present practical strategies to ensure that those "somethings," once found, are taught in such a way that the learning "takes" and that the "somethings" are internalized, applied and transferred appropriately. This section,

which comprises the bulk of the essay, addresses the "somel ws" of teaching for transfer.

Perkins and Salomon's "Good Shepherd Theory" of transfer (1988) proposes that, to foster transfer of learning, transfer must be "shepherded" or helped along. The "somehows" are the shepherding or mediating strategies that promote relevant transfer.

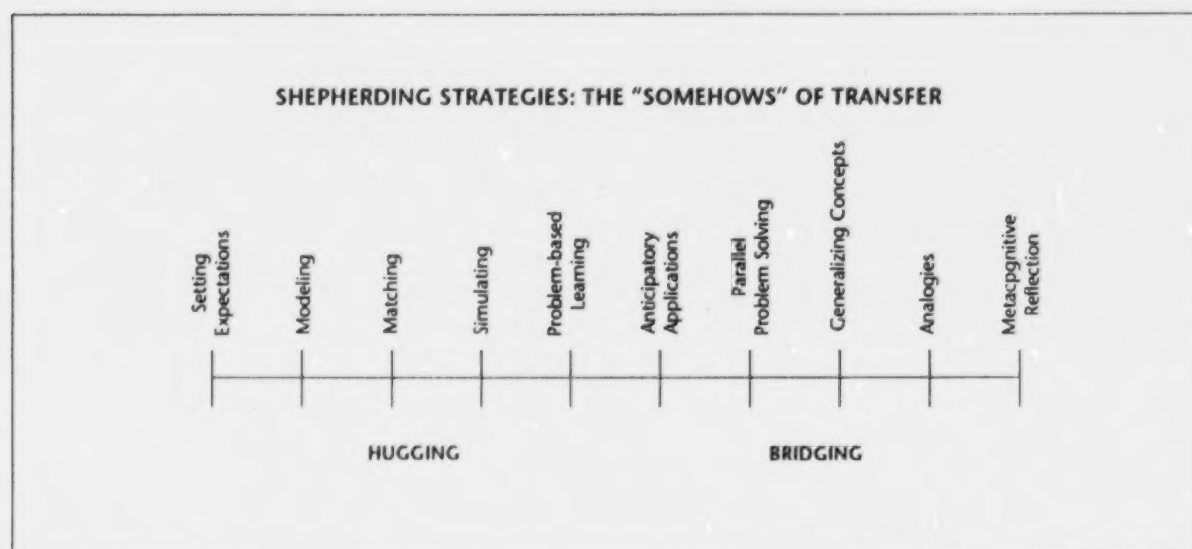


Figure 4

To elaborate slightly on the theory of mediated transfer, two roads to transfer are posited: the low road of near or simple transfer and the high road of far or complex transfer. We may design lessons that “hug” the expected outcome if we are looking for near or somewhat automatic transfer. For example, if we want students to become better writers, we have them write, rather than circle answers in a multiple choice worksheet model. Alternatively, we may select “bridging” strategies that call for mindful abstractions to encourage transfer. If we want students to connect the problem solving they do in math class with the problem solving they do in the scientific method, we orchestrate a discussion that leads students to generalize about problem solving. In the process, we bridge problem solving in math to problem solving in science.

In fact, we may even map out combinations of both hugging and bridging strategies to deliberately induce transfer. A specific example of combining strategies would be the use of simulations in the driver's education lab (to hug for transfer) as well as an exploration of analogies to sports in a discussion of defensive driving techniques (to bridge for transfer).

Figure 4 illustrates ten “somehows”—five “hugging” strategies to facilitate new or simple transfer.

and five "bridging" strategies to span wide gaps between original learnings and remote situations.

In the discussion of the "somehows" of transfer, each strategy includes a brief definition and an illustration of its use. In addition, specific examples are cited as practical cues for teacher use.

➡ Setting Expectations – HUGGING

[Stating Explicit Goals]

Definition: Talking to students about expectations for transfer to increase the likelihood that transfer occurs; explicitly planning into lessons the questions or tasks that help students connect across content, so transfer is more likely to occur.

Example: When studying the skill of detecting bias in social studies, students encourage each other to look for instances of bias in constructing graphs in math class or in point of view pieces in language arts class. Suggest that they look for bias across the curricula, and deliberately plant the seed for transfer.

Verbal Cues:

- “What’s the big idea?”
- “How does this connect to what you already know?”

MEDIATING TRANSFER

HUGGING STRATEGIES

1. *Setting Expectations*: targeting explicit goals
2. *Modeling*: demonstrating and showing
3. *Matching*: engaging in the very performance being developed, practicing
4. *Simulating*: role playing, acting out
5. *Problem-Based Learning*: learning through experiences

BRIDGING STRATEGIES

6. *Anticipating Applications*: developing rationale, scouting for relevant use
7. *Parallel Problem Solving*: moving learning from one context to another
8. *Generalizing Concepts*: extrapolating generic threads
9. *Using Analogies*: comparing, finding similarities
10. *Metacognitive Reflection*: thinking about thinking, planning, monitoring, evaluating

Figure 5

- "Where might you use this?"
- "Do you see how this might fit with what we were working with last week?"
- "How is this relevant?"

⇒ **Modeling** – HUGGING
[Showing, Demonstrating]

Definition: Demonstrating the desired behavior with a running monologue about what you're doing to emphasize key elements. Modeling the behavior for students to adapt; talking about it; making sense of the demonstration.

Example: When asking students to prioritize their homework, the teacher will first create the list of items on the board while talking about it. For instance, "Here's how I prioritize. Once I have listed all the things I want to do, I find the most urgent items and rank those numbers 1, 2, and 3. Then I find the least important items; things I would like to do, but are not due the next day. I rank those toward the bottom. Then I sort out the middle items. Finally, I take the most important items, or the things that need to be done the soonest, and put them at the top. Now I have prioritized my work."

Verbal Cues:

- "Here's an example."
- "Let me illustrate."
- "Give me a specific instance."
- "Show me."
- "Use this as a prototype."

⇒ **Matching** – HUGGING
[Demonstrating, Showing]

Definition: Matching the lesson design to the desired outcome; engaging the student in the very performance you're trying to develop; guiding the targeted behavior; using procedural learning.

Example: If the goal is to get students to take a stand, advocate a position, and support it with detail, give them many opportunities to see that behavior modeled. For example, weave agree/disagree questions throughout a lecturette, and have students practice "taking a stand" as they learn the art of public advocacy.

Verbal Cues:

- "Practice the model."
- "Try it."
- "Duplicate this."

- "Repeat the process."
- "Follow the steps."

⇒ Simulation – HUGGING

[Role Playing, Acting Out]

Definition: Role playing, personifying or simulating the "real thing" to hug the desired outcome; experiencing the actions and feeling of the actual situation by practicing or "pretending."

Example: In Driver Education classes, have students simulate driving before they drive an actual car, or act out the job interview taking on the role of the job applicant. Stage the trial of the big bad wolf (from "The Three Little Pigs") to learn about bias and jury selection.

Verbal Cues:

- "Pretend."
- "Put yourself in her place."
- "Imagine."
- "Take his role."
- "How might she think about this?"

⇒ Problem-based Learning – HUGGING

[Experiential Learning]

Definition: Placing students in problematic situations, immersing them in the experience, in order to pull together relevant information in an inductive teaching method that hugs the target behavior. Having students apply their knowledge in the context of the problem, with no "up front" information offered formally.

Example: Construct a situated learning experience from a current newspaper article. For example, in one article a student locker has been searched for drugs. Have students in the class decide if the student's human rights have been violated after gathering and evaluating data.

Verbal Cues:

- "Here's the situation..."
- "What do you need to know?"
- "What can you do?"
- "What is the goal?"
- "How can you accomplish the task?"

⇒ Anticipating Applications – BRIDGING

[Developing Rationale, Scouting for Relevant Uses]

Definition: Thinking about an upcoming opportunity to use the new idea; thinking about an adjustment that will make your application more relevant; targeting future applications or speculating on possible uses.

Example: After working on the division of fractions, guide students to project possible future uses of the skill as you mediate for transfer. Ask students, "How might you use this idea across content or in life?"

Verbal Cues:

- "How might you use this?"
- "What if you adapted it this way?"
- "Do you see any opportunities to try this out?"
- "Can you think of an application?"
- "Have you seen this used somewhere else?"

⇒ Parallel Problem Solving – BRIDGING

[Moving Learning from One Context to Another]

Definition: Using "Parallel thinking" to ask, "Where is this (idea) applicable in my personal life?" Taking information and drawing parallels with experiences, with prior information and past knowledge. Associating one idea with ideas already known and exploring options and possibilities for the application of an idea.

Example: Have students place a global or historic problem in the context of their personal lives to help them understand the more abstract global problem. For example, during the American Revolution the colonists did not want taxes. They were in conflict with the mother country. Ask students, "What do you do when you're in conflict with your mother? She wants you to eat your peas, and you hate peas. What do you do? Boycott? Retreat? Throw a temper tantrum? What strategies do you use? How do these compare to the strategies the colonists used?"

Verbal Cues:

- "Do you see parallels to your own situation?"
- "How is this like your life situation?"
- "Can you relate this to personal issues?"

LEARNING FOR A LIFETIME

- "Does this sound familiar?"
- "Do you see any similarities to your own life?"

⇒ *Generalizing Concepts* – BRIDGING

[Extrapolating Generic Threads]

Definition: Asking students to point out elements with general accountability in a given situation; encouraging them to generalize concepts; applying concepts universally.

Example: As students learn geometry, ask them to reflect upon their own problem-solving processes and to generalize about elements of that process that seem to help. For instance, students might say, "Use a diagram." Then ask, "Is that generally useful in other situations? How? Why? Give me some specific examples."

Verbal Cues:

- "What big ideas can you piece together from this?"
- "What truths seem apparent?"
- "What's the real lesson?"
- "Is there a rule, law, principle here?"
- "Can we say that 'Generally, speaking'...?"

⇒ *Using Analogies* – BRIDGING

[Comparing, Finding Similarity]

Definition: Finding likenesses yields useful transfer; finding and analyzing analogies; comparing; using metaphors and making creative connections.

Example: Have students compare courage and rain. ("For example, courage is like the rain. Both can come upon you unexpectedly.") Have students discuss how the "unexpectedness" of a courageous act is similar to the "unexpectedness" of a summer shower. Analyze this analogy and engage students in a discussion about courage that unpacks the analogy by elaborating and extending the thinking and explicitly forcing transfer through comparison. This seemingly difficult exercise is actually lots of fun. You may be surprised at the connections the students will make!

Verbal Cues:

- "How is a like b?"
- "a is like b because both c."

- "a : b :: c : d."

- "Compare a (abstract) to b (concrete)."
- "Find the similarities in a and b."

⇒ *Metacognitive Reflection* – BRIDGING

[Thinking About Thinking, Planning, Monitoring, Evaluating]

Definition: Planning, monitoring, and evaluating one's own thinking; being aware and controlling one's own thinking and behavior; thinking about thinking; tacit, aware, strategic, reflective use of thinking about thinking.

Example: After completing a series of math problems on the associative principle, ask students to think about how they attacked the problems. Ask, "What things were similar across problems? What were the stumpers? Were there any elements of this problem that you had encountered before? If so, how did you deal with them?" Have students evaluate their own performance, as they think about their thinking strategies and become aware of their own behavior in relation to their learning.

Verbal Cues:

- "What are your aims, goals, and objectives?"
- "Track your steps in this and evaluate your progress."
- "Look back and reflect on your work."
- "Monitor your progress periodically."
- "What would you do the same or differently next time?"

Shepherding the transfer of learning with the selective use of these ten hugging and bridging strategies can easily become an integral part of the instructional design. It is just a matter of consciously targeting transfer as a desired outcome, rather than simply assuming that transfer automatically happens. Once transfer is targeted, the appropriate scaffolding can be provided to carry the transfer.

Although these strategies for mediating transfer comprise only a partial list of the "somehows," they represent explicit tools for transfer that we can add to our instructional repertoire. As we become more conscious of teaching for transfer, we will find creative ways to facilitate transfer and continually add these instructional tools to our "teacher's tool kit."

SOMEWHERE'S OF TRANSFER

"Somewhere" Vignette

[Scenario #3: By asking students to think back to an experience or to project ahead to a possible application, the teacher targets the "somewheres" for future transfer.]

LITERATURE TEACHER: In *"The Old Man and The Sea,"* Hemingway presents an impressive characterization of a man who perseveres against tremendous odds. Take a moment to think back to a time in your life when you used your will power to stick to something and see it through. (After a minute or two of silence) Now, share your stories with a partner.

DENNIS: (turning to Louisa): Once when I was really little I climbed a tree and when I was trying to get down I slipped and ended up clutching onto this branch. I had to hold on really tight for a long time while my brother went to get the ladder. It seemed like forever.

LOUISA: I remember once when I forced myself to finish my social studies project because it was due the next day. I had to paint this salt and flour relief map. It was a lot of fun when I started—but boy did I get sick of it. I think that was hard to do—just like the old man's struggle with the marlin.

LITERATURE TEACHER: Now, go to your logs and think ahead. Write a sentence or two about how this ability to persevere will help you in another class. For example, when will persevering help you in math class or in the science lab. Be specific. Target an upcoming assignment for another subject area that is gonna take lots of will power and "stick-to-itiveness" to get it done. Try to think about how you can use this persevering attitude in other places. See if you can transfer it to another subject.

JOSE (writing in his log): The algebra problems are really hard for me, right now. If I don't give up so easily—if I stick to them longer, like the old man—maybe I can get through them.

**The "Somewheres" of Transfer:
Within/Across/Into**

The "somewheres" of transfer are the end targets of the "somethings" and the "somehows." By definition, learning in one situation and using that in another situation is called transfer. This transfer may occur within the content being taught, across disciplines to other subjects, or into life situations (conversely, of course, life experiences can transfer into school learning, etc.).

To suggest that one would teach something (or learn something) with no expectation for transfer or use is ludicrous. However, in viewing the research, the literature suggests that this transfer of learning, if "left alone" as in the "Bo Peep and Lost Sheep Theories" (Perkins and Salomon, 1988), may not occur as spontaneously or as regularly as we want.

However, when the transfer is shepherded, the likelihood for relevant application and use seems to increase quite dramatically. In order to shepherd or

mediate for transfer, we use hugging strategies that engage students in the very behavior desired or we use the bridging strategies of mindful abstractions as delineated previously in this chapter.

However, in addition to hugging and bridging, we can provide further, albeit temporary, scaffolding to the learning process by targeting specific somewheres. This additional targeting of the "somewheres" for transfer, within the same context, across disciplines or into life situations is fairly easy to do.

An example of targeting a "somewhere" for transfer within a similar context is the science teacher who directs students to relate the concept of the life cycle from the plant unit to the metamorphosis of the butterfly in the insect unit. To target a "somewhere" for transfer across subject areas, the math teacher may suggest that students check their hand calculations on the computer during their technology lab period. Similarly, to target a "somewhere" into real life situations, the global education teacher may cue students to scout the newspapers, magazines and broadcasts for current illustrations of aggression as an extension of the study of World War II. The model in Figure 6 illustrates how the "somewheres" fit into the transfer scheme.

Deliberately focusing the learner's attention on possible transfer opportunities is a powerful early-

use strategy for promoting the transfer of learning. Over time, of course, less scaffolding is necessary as the learner takes over the task of finding the "somewheres" for relevant transfer.

CONCLUSION

In summary, by targeting the "somewheres" for transfer, by facilitating further transfer with leading questions and promoting risk taking with far-reaching applications, the likelihood for meaningful transfer of students' learning is increased significantly.

By looking at previous lessons we've taught or upcoming lessons we are planning to use through the fresh window of transfer, the process for setting curricular priorities becomes pretty clear. In addition, once the priority "somethings" are sifted out, the specific similarities for transfer within the content, across disciplines or into life situations can be targeted. To achieve the desired outcomes of taking those important "somethings" to the specified "somewheres," teachers can select the various "somehows" of hugging and bridging strategies or combinations thereof to ensure transfer of learning. This complete model is depicted in Figure 6.

In closing, there are somethings that we want somehow to transfer somewhere. Hopefully, this discussion will provide the catalyst to begin the work of teaching not for a test, but for a lifetime.

REFERENCES

- Bartlett, P. (1990, Winter). *Review of education research*, 60(4), 206.
- Bellanca, J., & Fogarty, R. (1990). *Blueprints for thinking in the cooperative classroom*. Palatine, IL: Skylight Publishing.
- Beyer, B. (1987). *Practical strategies for the teaching of thinking*. Boston: Allyn and Bacon.
- Brandt, R. (1988, April). On teaching thinking: A conversation with Arthur Costa. *Educational Leadership*, 45(7), 11.
- Costa, A. (1991a). Orchestrating the second wave. *Cogitare*, 5(2), 1.
- Costa, A. (1991b). The search for intelligent life. In *The school as a home for the mind*. (pp. 19-31). Palatine, IL: Skylight Publishing.
- Costa, A., & Garmston, R. (1985, March). The art of cognitive coaching: Supervision for intelligent teaching. Paper presented at the Annual Conference of the Association for Supervision and Curriculum Development, Chicago.

- Cousins, N. (1981). *Human options*. New York: Norton.
- Eisner, E. (1991, February). PDK/IRI Critical Issues Seminar: Rosemont, IL.
- Feuerstein, R. (1980). *Instrumental enrichment*. Baltimore: University Park Press.
- Fogarty, R. (1991). *The mindful school: How to integrate the curricula*. Palatine, IL: Skylight Publishing.
- Fogarty, R. (1989). *From training to transfer: The role of creativity in the adult learner*. Doctoral dissertation, Loyola University of Chicago.
- Fogarty, R., & Bellanca, J. (1989). *Patterns for thinking: Patterns for transfer*. Palatine, IL: Skylight Publishing.
- Fogarty, R., Perkins, D., & Barell, J. (1991). *How to teach for transfer*. Palatine, IL: Skylight Publishing.
- Fullan, M. (1982). *The meaning of educational change*. New York: Teachers College Press.
- Hord, S., & Loucks, S. A concerns-based model for delivery of inservice. CBFM Project - Research and Development Center for Teacher Education, The University of Texas at Austin.
- Hunter, M. (1982). *Teach for transfer*. El Segundo, CA: TIP Publications.
- Joyce, B. (1986). *Improving America's schools*. New York: Longman.
- Joyce, B., & Showers, B. (1983). *Power in staff development through research and training*. Alexandria, VA: ASCD.
- Joyce, B., & Showers, B. (1980, February). Improving inservice training: The message of research. *Educational Leadership*, 43(8), 380.
- Marzano, R., & Arredondo, D. (1986, May). Restructuring schools through the teaching of thinking skills. *Educational Leadership*, 43(8), 23.
- Parnes, S. (1975). *Aha! Insights into creative behavior*. Buffalo: D.O.K.
- Perkins, D. (1988, August 6). Thinking frames. Paper delivered at ASCD Conference on Approaches to Teaching Thinking, Alexandria, VA.
- Perkins, D. (1986). *Knowledge as design*. Hillsdale, NJ: Erlbaum.
- Perkins, D., & Salomon, G. (1989, January-February). Are cognitive skills context bound? *Educational Researcher*, 18(1), 16-25.
- Perkins, D., & Salomon, G. (1988, September). Teaching for transfer. *Educational Leadership*, 46(1), 22-32.
- Polya, G. (1957). *How to solve it*. Princeton, NJ: Doubleday.
- Posner, M., & Keele, S. (1973). Skill learning. In R. Travers, (Ed.), *Second handbook of research on teaching*. (pp.805-831). Chicago: Rand McNally.
- Sergiovanni, T. (1987, May). Will we ever have a true profession? *Educational Leadership*, 44, 44-49.
- Sternberg, R. (1986). *Intelligence applied: Understanding and increasing your intellectual skills*. New York: Harcourt Brace Jovanovich.
- Sternberg, R. (1984, September). How can we teach intelligence? *Educational Leadership*, 42(1), 38-48.
- Tyler, R. (1987, January). The first most significant curriculum events in the twentieth century. *Educational Leadership*, 44(4), 36-37.
- Wittrock, M. (1967). Replacement and nonreplacement strategies in children's problem solving. *Journal of Educational Psychology*, 58(2), 69-74.

METACOGNITION: MATTERS OF THE MIND, MATTERS OF THE HEART

Peter Winograd and Robert W. Gaskins

In teaching me independence of thought, they had given me the greatest gift an adult can give to a child besides love, and they had given me that also.

—Courtenay, 1989, p. 326

When we become teachers, we assume a responsibility to help students build a broad foundation of knowledge across a variety of topics, to help students get excited about learning, and to help students learn to independently use their knowledge flexibly and creatively. As Courtenay (1989) stated, it is this final charge, the development of "independence of thought," that is the greatest gift that teachers can give.

How can teachers help their students develop independence of thought? This question is of vital importance. Like most questions of such magnitude, a great deal of research has been devoted to this topic, and a great many theories have been proposed to address this issue. The purpose of this chapter is to examine research related to the concept of metacognition, and to see what insights this

research offers to educators interested in creating the kinds of classrooms that nurture independence of thought.

THE NOTION OF METACOGNITION

The term *metacognition* appeared in research literature in the mid-1970s and quickly gained popularity as researchers and practitioners began to explore the theoretical and practical implications of the concept (Paris, Wasik, & van der Westhuizen, 1988). As we shall see, researchers vary somewhat in how they define metacognition because different researchers have emphasized different aspects of the concept in their research (Brown, 1978; Flavell & Wellman, 1977; Paris & Winograd, 1990). Even so, we can offer a broad definition that summarizes our current understanding of the concept of metacognition.

Metacognition is self-appraisal and self-management of one's own cognitive processes. Interest in metacognition grew out of research investigating cognitive strategies that enhanced learning and memory. Flavell and his colleagues proposed some of the seminal frameworks for metacognition by

emphasizing what learners know about person, task, and strategy variables relevant to learning (Kreutzer, Leonard, & Flavell, 1975; Flavell, 1978). Brown and her colleagues also provided some of the fundamental groundwork in the study of metacognition by emphasizing a different aspect of metacognition—that is, the executive control of cognition processing, including planning, monitoring, checking, and revising (Brown, 1978; Baker and Brown, 1984; Brown & Smiley, 1978).

In the decade and a half following the innovative work of these researchers, a large body of research has accumulated dealing with metacognition. Paris, Wasik, and van der Westhuizen (1988) identified more than 200 empirical studies, reviews, essays, and other papers published about metacognition in more than twenty journals. Paris and his coauthors are quick to point out, however, that their review was limited to articles that specifically mentioned metacognition in the title, and that it does not include chapters on metacognition in edited volumes.

The important point that emerges from the review by Paris and his colleagues is that metacognition has generated a lot of enthusiasm in the field of education, particularly in the teaching of reading. Borkowski, Carr, Kellinger, and Pressley (1990) divide the history of metacognition into two generations. The first wave of metacognitive research was primarily descriptive and correlational in nature. Researchers investigated the relationships between subjects' awareness of their learning processes and the quality of their performance on a learning task. For example, Garner and Kraus (1981-82) focused on the relationship between students' knowledge of comprehension strategies and their reading performances and found that better readers seemed to have more highly developed and more appropriate awareness of reading strategies than did poor readers.

In another early study of metacognitive theory, Winograd and Johnston (1982) examined the difference between sixth grade good and poor readers' abilities to detect errors and inconsistencies in what they were given to read. The "error-detection paradigm" was a popular research tech-

nique used to explore readers' abilities to monitor their comprehension. Winograd and Johnston found that although good readers were better than poor readers at detecting errors, a surprising number of sixth-graders failed to identify some very blatant errors. Winograd and Johnston argued that it was difficult to draw the conclusion that sixth-graders were lacking in metacognitive abilities and that perhaps simple correlations drawn between measures of students' awareness and measures of their performance were too limited a way to measure metacognition. A number of researchers interested in metacognition were drawing similar conclusions. Researchers were finding that metacognition was indeed a complex construct and that learning more about it required a variety of experimental approaches. This led to some of the changes characteristic of the second generation of research on metacognition.

Borkowski and his colleagues characterize the second generation of research on metacognition as one of increased theoretical and methodological complexity. In this second generation, researchers became more interested in intervention research aimed at teaching students how to use learning strategies more appropriately. Some researchers focused their efforts on helping students learn specific strategies (Dewitz, Carr, & Patberg, 1987). Some aimed at helping students learn multiple strategies (Ghatala, Levin, Pressley, & Lodico, 1985; Paris, Cross, & Lipson, 1984). Still others focused their efforts on training teachers to provide better instruction that included aspects of metacognition (Duffy, et al., 1986).

Currently, researchers interested in metacognition continue to concentrate on intervention studies (e.g., Gaskins & Elliot, 1991). In addition, much of the current discussion about metacognition centers on the theoretical nature of the construct itself (Borkowski, et al., 1990; Garner, 1987; Paris & Winograd, 1990; Weinert & Kluwe, 1987). This theoretical discussion is particularly relevant for educators interested in creating thoughtful classrooms; thus, we address certain aspects of this discussion in the following section as we explore metacognition theory for relevant applications.

CULTIVATING THOUGHTFUL STUDENTS: THE ROLE OF AFFECT IN METACOGNITION

Until recently, relatively little attention has been given to the role of affect in metacognition. However, research has provided clear evidence that emotions and affect influence how students think about themselves as learners (Borkowski, et al., 1990). This is significant because students' self-perceptions have an impact on their ability to engage in metacognitive behavior. Consider, for example, the following anecdote from the work of Brown, Bransford, Ferrarra, and Campione:

Upon encountering his first laboratory task, Daniel volunteered this telling comment, "Is this a memory thing? (It wasn't.) Didn't they tell you I can't do this stuff—Didn't they tell you I don't have a memory?" (1983, p. 147)

This quote illustrates the degree to which affect can influence self-appraisal and self-management. This student's lack of self-esteem and self-confidence resulted in a virtual acceptance of failure before he had even attempted the task.

Research examining differences between good and poor readers has shown in a similar fashion the powerful influence of affect upon metacognitive behaviors and learning in general (Butkowsky & Willows, 1980; Johnston & Winograd, 1985). Factors such as repeated failure, misconceptions about reading, and inappropriate attributions can contribute to low self-esteem and serious anxiety toward reading experiences. In essence, these poor readers no longer believed that they could manage their own success. They no longer felt they were in control of their own learning. Therefore, they adopted a passive or negative stance toward reading in an attempt to preserve their egos and minimize the effects of shame and failure. When these poor readers did display active behaviors, they were often strategies intended to avoid reading or even thinking about text information altogether.

The increased emphasis on the affective side of learning and its impact on metacognition has

helped researchers expand their conceptual frameworks to include research on motivation, self-esteem, self-efficacy, and other related constructs. The increased emphasis on affect has also helped many of us understand more clearly what it takes to create classrooms that support, rather than suppress, students' independence of thought.

Researchers in motivation achievement, for example, have identified several types of goals used in school settings to motivate students (Covington, 1983; Maehr, 1983; Nicholls, 1983). These goals have clear implications for the development of metacognitive strategies. They differentially affect students' self-esteem, self-confidence, and orientation toward learning tasks, and thus have important implications for the creation of classrooms that support students' independence of thought.

Maehr, for example, identified four kinds of goals that motivate students in school settings: ego goals, extrinsic goals, intrinsic goals, and social goals. Ego goals are satisfied by success in competition, where one person outperforms another and there are clear winners and losers. For example, ego goals are involved when students compete to see who can obtain the highest score on a test. Extrinsic goals are achieved by obtaining symbolic rewards. Working to get an "A" in a subject is a common example of extrinsic goals. Intrinsic goals are fulfilled by the satisfaction involved in the task itself. Reading a book for no other reason than sheer involvement, what Rosenblatt (1978) describes as aesthetic reading, is an illustration of an intrinsic goal. Finally, social goals are realized through the development of relationships with significant others, including friends, teachers, and parents. Social goals develop a sense of community, a sense of approval, and a sense of belonging. Students listening intently to a teacher read aloud, students sharing the experience of a good book, and students cooperatively working through authentic tasks are all scenarios that portray the interrelated power of intrinsic and social goals (Winograd, Turner, & McCall, 1990).

Too often, however, ego and extrinsic goals dominate current reading instruction. Too often, children measure their success as readers by how

well they are doing compared to their peers (Holt, 1964; Nicholls, 1983). Too often, the only satisfaction derived from an encounter with a text comes in the form of a passing grade. Too often, teachers and administrators measure the success of their reading instruction by how they compare to other districts on a statewide test (Shannon, 1986; Winoograd & Smith, 1987).

The domination of ego and extrinsic goals damages our attempts to develop independence of thought. These goals adversely affect motivation and metacognition in at least three ways. First, because of the competition nature of ego and extrinsic goals, success and failure have serious implications for the way students are seen by their peers and the way they see themselves. For low achievers, competition suggests the very real possibility of repeated failures, with the result of being viewed by peers and self with less regard. Repeated failure and public humiliation have a tendency to lower most students' self-confidence and many even begin to expect failure (Johnston & Winoograd, 1985). These students feel they are unable to manage their own learning, and they choose to avoid learning situations as much as possible rather than risk further humiliation. Thus, they develop neither the "skill" nor "will" necessary to become independent thinkers and learners (Paris, Lipson, & Wixson, 1983).

Second, ego and extrinsic goals focus attention on the products of task completion rather than the process of learning. With ego and extrinsic goals, satisfaction is found outside of the task itself, rather than in doing the task. An emphasis on extrinsic rewards actually devalues the intrinsic satisfaction and meaningfulness inherent in authentic texts or tasks (Csikszentmihalyi, 1985; Lepper & Green, 1978). When extrinsic rewards are stressed, learning becomes work rather than an opportunity for creative exploration (Fleming & Johnston, 1986; Lepper & Green, 1978). As Maehr stated:

"If an extrinsic reward is the goal of behavior, then one typically does not experiment with means, manners, and styles. The surest route to success is preferred, and risk taking is eschewed." (1983, p. 197)

The third problem with ego and extrinsic goals is that, in a sense, these goals disempower students. When ego and extrinsic goals are the means of motivation, teachers hold the power over judgments of success and failure. Thus, over time students can become dependent on the judgments of the teacher—in the form of praise or rewards—to assess their own performances (Kohn, 1991). Students who may have the strategies necessary to engage in self-appraisal and self-management may not do so. Why should they when the teacher will do it for them? For many students, ego and extrinsic goals may be more likely to develop dependence rather than independence of thought.

Emphasizing intrinsic and social goals rather than ego and extrinsic goals is essential in cultivating thoughtful students. Intrinsic and social goals are positive influences on learning in all the areas in which ego and extrinsic goals seem to adversely affect learning. Intrinsic and social goals focus on the sense of personal satisfaction or social belonging that can come from engaging in the process of learning itself; ego and extrinsic goals focus on competition and the relief of winning and the fear of losing. Intrinsic and social goals tend to build self-esteem and self-confidence; ego and extrinsic goals tend to damage them. Finally, intrinsic and social goals focus on leading students toward independence of thought and interdependence within the classroom community; ego and extrinsic goals may result in creating students who are dependent on the teacher.

CREATING THE THOUGHTFUL CLASSROOM

In recent years, researchers in reading and other fields have developed a number of teaching methods that emphasize intrinsic and social goals and help create thoughtful classrooms full of independent thinkers and learners. In this section we briefly describe a number of these methods.

Teaching Learning Strategies

One important way that educators can help students become independent thinkers is by teaching learning strategies. Educators interested in learn-

ing about learning strategies can find a great deal of information in the literature dealing with instruction in thinking and cognition (Gaskins & Elliot, 1991; Jones & Idol, 1990; Segal, Chipman, & Glaser, 1985); learning strategies (Pressley, et al., 1990; Weinstein, Goetz, & Alexander, 1988); and with metacognition (Baker & Brown, 1984; Borkowski, Carr, Rellinger, & Pressley, 1990; Paris & Winograd, 1990). Since our focus is on metacognition, we confine our discussion to those learning strategies that help students appraise and manage their own learning. In addition, although our illustrations are drawn from research in reading, such strategies are useful across the content areas (Gaskins, 1988; Paris & Winograd, 1990; Peterson, Fennema, & Carpenter, 1989).

A learning strategy is any purposeful action that an individual takes in order to increase his or her successful completion of a task (Paris, Lipson, & Wixson, 1985). In reading, for example, readers can enhance their enjoyment or understanding of what they are reading by a variety of purposeful actions, including previewing the text, making predictions, setting purposes for reading, activating prior knowledge about the topic, visualizing while reading, paraphrasing, raising questions, reading ahead, rereading, taking notes, and making graphic organizers.

In our own work, we have found it useful to organize the strategies we teach into ones that students can use before reading (previewing, setting purposes, activating prior knowledge, predicting, etc.); while reading (checking and clarifying comprehension, visualizing, taking notes, etc.); and after reading (reviewing comprehension, responding to and applying different kinds of reading, etc.). Our intent, and that of other researchers dealing with learning strategies, is to provide students with a repertoire of concrete ways they can use to plan their reading, to regulate their comprehension, and to evaluate their progress. In short, we want students to become actively involved in reading.

We want to emphasize, however, that strategies are not something to be learned by rote by all students; what makes a strategy effective is that it is selected or invented by a learner to fit his or her

purpose and to fit the demands of a particular task (Paris, Lipson, & Wixson, 1983). A strategy is a purposeful action used appropriately and flexibly by the learner.

A number of programs and instructional techniques have been developed for teaching students learning strategies. We favor approaches that include three key features of sound strategy instruction. First, teachers model their use of the strategies so that students have something to emulate. For example, Palincsar and Brown (1986) developed an instructional technique in which teachers modeled the use of four strategies—predicting, generating questions, clarifying points in the text, and summarizing. These researchers used dialogue as the means for helping students become more strategic readers. Initially, teachers led the dialogue and modeled the use of the strategies. Students gradually accepted the responsibility for leading the dialogue and modeling the strategies. Teachers and students took turns modeling. This reciprocal teaching provided the support that poor readers needed in order to learn appropriate use of the strategies (Palincsar, Ransom, & Derber, 1989). Other researchers suggest that teachers “think aloud” or provide a running commentary of the reasoning they do as they construct meaning, confront and solve problems, and respond to what they have read (Afflerbach & Johnston, 1984; Duffy, Roehler, & Hermann, 1988). Whether teachers use conversations or think aloud, they provide students models of how an expert performs a particular task. Through such approaches, teachers can help students understand why certain strategies are appropriate, how to apply the strategies that have been selected, how to monitor the effectiveness of the strategies, and how to use fix-up strategies when necessary.

The second key feature of sound strategy instruction is that teachers provide clear and complete explanations of the strategies they use and model. The lack of clear explanations has been documented in many traditional approaches to teaching reading comprehension (Durkin, 1978-79). Thus, many current approaches take great pains to ensure that students understand what the strategy is, why it is important to use, how to employ

it, when and where the strategy is appropriate, and finally, how to evaluate the use of the strategy (Winograd & Hare, 1988). Paris and his colleagues, for example, used metaphors and group discussions to help children learn a variety of strategies, including planning for reading and monitoring comprehension (Paris, Cross, & Lipson, 1984; Paris & Jacobs, 1984). Their studies indicated that children respond positively to metaphors like "Be a reading detective" for evaluating the reading task and "Road to reading disaster" for detecting comprehension failures. Such explanations take time, but they are important for those children who need guidance in learning how to comprehend.

A number of researchers also argue that instructional explanations should address both cognitive and motivational factors (Corno & Mandinach, 1983; Covington, 1983; Nicholls, 1983; Schunk, 1990). This is an important advance in instruction because it addresses the interrelated nature of cognitive, metacognitive, and motivational dimensions of academic learning (Paris & Winograd, 1990).

The third important feature of effective strategy instruction that we favor is that students work cooperatively. Cooperative learning allows students to work together to discuss ideas and share strategies as they read. Such discussions stimulate metacognitive insights that are central to the effective use of learning strategies (Paris & Winograd, 1990). Indeed, one of the useful ways to think about metacognition is to consider it as shared knowledge about thinking. When students can analyze and talk about their own behavior with the teacher or with peers, they make their thinking public and create better opportunities for understanding how and why they should use particular strategies (Costa, 1984; Paris, Lipson, & Wixson, 1983). Cooperative learning is also important because it enables students to both give and receive help from their peers, behaviors which seem to lead to higher achievement and lowered anxieties (Webb, 1982).

In summary, educators can help students become thoughtful learners by explicitly teaching them to use learning strategies. We want to stress, however, that it is critical that such strategy instruction take place while students are engaged in

authentic learning tasks (Winograd & Paris, 1988). In our next section, we examine how this can be accomplished.

Creating a Literate Environment

Plato once said, "What is honored in a country will be cultivated there" (cited in Morrow, 1989b). The same can be said of schools. If we wish students to become thoughtful and independent learners, then we must organize our classroom environment and activities to cultivate these traits. In terms of literacy, for example, teachers need to engross students in a language-rich environment in which students are surrounded by print and are given significant amounts of time to engage in authentic reading and writing activities.

Authentic reading and writing activities are ones that occur outside of school. Cunningham, Moore, Cunningham, & Moore clarify further by stating:

Real reading means that students are reading books, magazines, and a variety of other real materials. Real writing is not copying or filling in a blank or completing a workbook page; rather, it is writing a letter or a story or a newspaper advertisement. (1989, p. 286)

It is important for students to engage in authentic reading and writing activities—as opposed to contrived reading and writing activities—because we want students to experience the intrinsic and social motivation that is derived from reading good books written by real authors. In addition, we need to provide students with daily opportunities to become authors themselves—authors who write for real purposes—so they can experience the intrinsic and social motivation that is found in writing as well.

One of the most important components of a literate environment is reading aloud to students every day from good children's literature and other texts (Bridge, 1989; Cullinan, 1987; Lytle & Botel, 1988; Trelease, 1989). Reading aloud is considered one of the building blocks of emergent literacy. When teachers, parents, or siblings read aloud and engage in discussions about books and reading, children have models of how sophisticated readers

use a variety of strategies to interact with text. Reading aloud—and the dialogue between the reader and audience, which is an essential component of the read aloud experience—is also instrumental in developing children's knowledge in a variety of areas, such as vocabulary, story structure, grammar, particular subject areas, and literary genres. McCormick (1977) found that when teachers read aloud to their students, the students' comprehension and vocabulary test scores increased significantly.

Perhaps an even more important function served by reading aloud is the social, emotional, and motivational function served by reading aloud. Through reading aloud children learn that books offer them the chance to explore worlds they might never encounter, deal with issues they might never face, and live adventures and experience feelings they might otherwise never have. Reading aloud also provides a time of love and sharing during which strong affective bonds can be formed between participants (Teale, 1982). Finally, through reading aloud, children pick up on the love their teachers feel for books, and they come to share that love for books themselves. In short, reading aloud promotes both intrinsic and social goals. It is an activity that enables children to develop the skills, strategies, and attitudes necessary to become independent readers.

Teale studied the interactions that happened between children and parents around books, but his insights apply here as well. It is important that adults and children share because, as Teale stated:

On one hand, such events are 'substantive' in that they put the child in touch with the functions, uses, processes, and conventions of literacy . . . On the other hand, adult-child interactions around literacy are 'motivational' for the child; they serve to forge links between positive affect and reading activities independently. (1982, p. 135)

Another essential component of a literate environment is a classroom library or reading center. Research suggests that children who have immediate access to books read more than students who do not (Bissett, 1969; Morrow, 1982; Morrow & Weinstein, 1986). But a successful classroom library

involves more than simply access to books (Morrow, 1989a). The physical arrangement and organization of a classroom library plays a significant role in determining the degree to which students will use it (Morrow, 1982, 1989a). For example, successful classroom libraries are inviting and organized for easy use (Morrow, 1989a). In addition, successful classroom libraries are supplemented by teacher-directed activities, such as heightening students' interest in books, teaching students how to select books, and teaching students how to care for books (Lytle & Botel, 1988; Morrow & Weinstein, 1986).

In creating a literate environment, it is also important to consider that real reading and writing activities need not be restricted to the language arts class. Real reading and writing activities apply across the curriculum. One way to have students engage in real reading and writing activities across the curriculum, and to connect content areas, is to create thematic units or webs (Pappas, Kiefer, & Levstik, 1990; Tompkins & Hoskisson, 1991). Thematic units focus on broad topics that cut across subject areas. Thus, thematic units provide students the opportunity to use language—listening, speaking, reading, and writing—in integrated ways for authentic purposes across the curriculum.

Thematic units allow students to develop both a "depth" and "breadth" of understanding about particular topics (Pappas, Kiefer, & Levstik, 1990). The coherence between areas of study within the unit provide students the opportunity for making connections between concepts and recognizing relationships that they otherwise might not have recognized. Reflecting on connections and relationships is facilitated by providing students with ample time to explore ideas, complete activities, and share projects. This time also allows students sufficient opportunity to explore particular ideas and concepts in depth. Thus, students participating in thematic units come away with rich, multifaceted understandings of topics. In addition, the large amount of time allotted for group work is important because it reflects the social nature of learning and builds a sense of community within the classroom.

The breadth of thematic units can vary depending on the needs and intentions of the teacher using them. Thematic units can be extremely focused. For example, they can focus on poetry, horses, a particular piece of literature, or a particular author. Or they can be quite broad, such as food, explorations, giants, or journeys. Regardless of the breadth of a unit, all units draw on a wide range of resources, such as various genres of literature and types of print (newspapers, magazines, letters, etc.), artifacts, equipment, props, art, and community resources. These resources can be the springboard for many different types of authentic learning activities and are critical in helping students learn how to use learning strategies to achieve important outcomes.

In summary, if we wish to create a thoughtful classroom full of independent thinkers and learners, we must ensure that the activities we set for children are worth doing. If we focus solely on teaching learning strategies without regard for the quality of activities used in the classroom, then our efforts will be in vain. Metacognition is most likely to be invoked when individuals are pursuing goals they consider important. When we provide students with authentic texts and tasks, we take advantage of the intrinsic and social nature of meaningful learning.

Mentor Program

In discussing the creation of the thoughtful classroom, we have emphasized the importance of social interactions in the development of a variety of higher-order thinking skills, including metacognition (Vygotsky, 1978). In this section, we focus on another way that educators can involve students in important social interactions.

Students, especially those at risk of failure, need to feel that they belong to a community. They need to build affective bonds with the teacher and with other students. As Bowlby commented:

Human beings of all ages are happiest and able to deploy their talents to best advantage when they are confident that, standing behind them, there are one or more trusted persons who will come to their aid should difficulties arise. (1979, p. 103)

This advocate could be a teacher or an important adult in a student's life, or it could be another student. What is important is that the advocate can provide support and guidance for the student.

The need for a supportive, trusting advocate is particularly important for the students experiencing academic difficulties. As Mann (1986) suggests, reaching out to weak students and providing personal contact is an essential part of successful intervention programs. He suggests that schools need to become as concerned about being "high touch" as they are about being "hi-tech."

One program that exemplifies the principles outlined by researchers like Bowlby and Mann is the *mentor program* developed at Benchmark School, a school for poor readers in Media, Pennsylvania. In the mentor program, staff members volunteer to be mentors for students who are doing poorly academically and need support. The role of the mentor is to be an academic coach, a cheerleader, and a friend. The mentor is a person who is there to provide guidance, advice, and assistance when academic problems arise and who is there to congratulate and share in the students' successes when they occur. The mentor's ultimate goal is to help students develop their cognitive and metacognitive skills and learn to organize their time and resources so they can be more successful in school. Related to this goal, the mentors also strive to help students build confidence in their own abilities and feel good about themselves.

The mentor program works in the following manner. The mentors have one formal meeting a week with their students for about 15 to 25 minutes. These meetings generally occur either before or after school—for example, while waiting for the bus—or, in the large majority of cases, during lunch. During the first few meetings, mentors get to know their students and build rapport. Some mentors ask their students to come up with a list of things that they (the students) do well. Then the mentors ask specifically what the students would like help with. In every instance, the mentor and student work together to set a goal. At first, many students are hesitant to admit to problems; instead they pick a goal that they think they can accom-

plish. That is fine. The students meet with success, begin to feel more comfortable with their mentor, and then move on to a more important goal next time.

Once the program is underway, students begin to seek help from their mentor. When this occurs, mentors and students explore exactly why the students are having trouble, and the mentors ask the students what strategies they possess that might be appropriate in this instance. In general, the mentors ask students questions in an attempt to get students to think through problems and situations for themselves. The mentors provide guidance and modeling when necessary, but just the minimum amount that is needed for the students to succeed.

In addition to the formal meetings, students and mentors typically touch base with each other for a short time each day. Sometimes mentors will contact their students in the morning and ask if they need any help reviewing for a test that they know is that day, or they may ask if their students got the paper typed that they needed to get done. What is important is that the students know that the mentors care about them and that they can count on their mentors when they need assistance.

Once in a while students will get themselves in a bind and come to their mentor desperately in need of help. For example, they may have a big project due the next day and they have not started yet. In such cases, mentors provide extensive support and guidance and may even do a lot of the work for the students this one time. But this assistance is accompanied by a discussion of how the students can avoid getting themselves in a similar situation in the future. Thus, the students learn that the mentors do care about them and that they are there for them. The students also learn strategies for handling the situation more independently the next time.

As the school year progresses, it becomes more and more common for students to come to their mentors to share the excitement of getting an "A" on a test or high praise for a particular project. In these instances, the mentors enjoy sharing the students' excitement, but they also take the opportunity to get students to reflect on why they did so

well on this test or project. They get them to think about what cognitive and metacognitive strategies they employed. This process helps the students develop their awareness and control over their own cognitive processes.

The fact that students and mentors share the excitement about getting an "A" on a paper raises an interesting point about the nature of ego, extrinsic, intrinsic, and social goals. It is clear that these categories are complex, interrelated, and often overlapping in nature. It also provides us with a glimpse of how social motivation can enhance the positive aspects and perhaps soften the more destructive dimension of ego and extrinsic motivation.

In order for the mentors to become adept at meeting students' needs as they arise, the mentors have a group meeting once a week with a psychologist who acts as a consultant and trainer for the mentors. In these meetings, the mentors talk about issues that have come up in their sessions, and, as a group, they brainstorm ideas that might help in these situations.

Mentors receive additional support and guidance through a journal, each mentor's record of what occurs in the mentor-student meetings. These journals are submitted once a week to the consultant or school principal who then provides comments, including responses to questions in the journals, feedback regarding progress made in the meetings, and praise for the way in which mentors are supporting and guiding their students.

A number of studies (Csikszentmihalyi & McCormack, 1986; Dillion, 1989) indicate that the relationship between influential teachers and receptive students seems to increase the level of motivation, interest, and confidence of both teachers and students. Thus, the mentor program and programs like it serve an important function in the development of the thoughtful classroom. In addition to providing guidance in cognitive and metacognitive strategies, mentors provide students with a model to emulate, and they help develop a sense of belonging and a sense of community that is an essential component of a thoughtful classroom.

Cultivating Thoughtful Assessment

Throughout this chapter we have emphasized the theme that metacognition involves both affect and cognition. We have also argued that the domination of competition and extrinsic goals does profound damage to our efforts toward creating thoughtful classrooms. Traditional approaches to assessment are among the worst offenders in this regard. Therefore, educators interested in helping their students gain independence of thought must consider ways of improving assessment.

Educators interested in creating thoughtful classrooms should keep two important guidelines in mind as they consider ways to improve assessment. First, instruction should drive assessment. If educators really want students to develop into thoughtful and independent learners, then at least some assessment should focus on students' abilities for self-appraisal and self-management. Second, assessment should address the needs of its audience. In thoughtful classrooms, the students themselves are the audience, and the purpose of these kinds of assessments is to help students gain ownership of their learning. Teachers, parents, and administrators are interested in assessment, of course, but these particular kinds are not intended to be used as public measures of achievement or accountability.

One powerful example of how students can gain ownership of their own learning is the concept of learning portfolios. Portfolios are "purposeful collections of student work that exhibit the student's efforts, progress, and achievements in one or more areas" (Paulson, Paulson, & Meyer, 1991, p. 60). Student participation in constructing portfolios and evaluating their contents is crucial. Portfolios are intended to increase students' ownership of their learning; portfolios are done by students rather than to them. Consider some of the kinds of information that can be included in a reading and writing portfolio:

- Students can keep lists of topics they are interested in exploring, drafts of current manuscripts, and other records of work in progress. Portfolios that include work in progress are useful to students because it en-

ables them to work on important projects over time.

- Students can select the best examples of their written work, which may include different kinds of writing—persuasive, informative, fiction, reaction, report, etc. Students can then write a brief evaluation of why they selected each piece as one of their best.
- Students can easily keep lists of books read throughout the year with a minimum amount of paperwork. At selected times of the year, students can write a brief self-evaluation of what books or authors they found most worthwhile.

Note how the samples of student work that are collected in the portfolio are opportunities for self-evaluation by the student. Teachers can have input as well, but the key to a successful portfolio is that the students themselves gather, display, and reflect on their own work and their own progress. Such portfolios provide students with a concrete and systematic means of self-appraisal and self-management. As Paulson, Paulson, & Meyer stated, "If carefully assembled, portfolios become an intersection of instruction and assessment: they are not just instruction or just assessment, but, rather, both" (1991, p. 61).

Portfolios can, of course, serve a number of purposes, as long as those purposes do not conflict. For example, the portfolios we just described are extremely useful for parent-teacher conferences or to pass on to the teacher in the next grade. But a number of educators and students also find portfolios useful for meeting ongoing diagnostic needs for both students and teachers. Portfolios used for these purposes can contain a variety of other measures of reading and writing performance, including daily classroom observations; interviews and checklists designed to assess the child's motivations and attitudes towards reading; and results of other formal or informal assessments. Finally, we should note that portfolios are unlikely to be the only method of assessment that a school or district uses to evaluate the performance of its students. However, if educators sincerely want their students to become independent learners, then portfolios

can be a powerful tool for creating thoughtful classrooms.

SUMMARY

As educators consider ways of achieving instructional excellence for the next century, they should focus on those changes that help children develop independence of thought. Metacognition offers us a valuable framework for understanding how we accomplish this important goal. It is crucial that we understand that metacognition—that is, engaging in self-appraisal and self-management—involves both cognition and motivation. In addition, it is important to understand that individuals are most likely to engage in self-appraisal and self-manage-

ment when they are striving to reach the goals they value. Thus, our efforts toward helping students become more metacognitive are effective to the extent that we focus on both the cognitive and affective dimensions of teaching and learning.

We can create thoughtful classrooms by teaching students to use learning strategies appropriately and flexibly; by ensuring that students are engaged in high-quality learning activities; by providing students with role models to emulate and mentors to cherish; and by helping students take ownership of their own learning with assessments that are constructive rather than destructive in nature. If we can make these kinds of changes, we should find that education in the next millenium will be more rewarding both for our students and for ourselves.

REFERENCES

- Afflerbach, P., & Johnston, P. (1984). On the use of verbal reports in reading research. *Journal of Reading Behavior*, 16(4), 307-322.
- Baker, L., & Brown, A. L. (1984). Metacognitive skills and reading. In P. D. Pearson, M. Kamil, R. Barr, & P. Mosenthal (Eds.), *Handbook of reading research* (pp. 353-394). New York: Longman.
- Bissett, D. (1969). *The amount and effect of recreational reading in selected fifth grade classes*. Unpublished doctoral dissertation, Syracuse University, Syracuse, New York.
- Bowlby, J. (1979). *The making and breaking of affective bonds*. London, England: Tavistock Publications.
- Borkowski, J. G., Carr, M., Rellinger, E., & Pressley, M. (1990). Self-regulated cognition: Interdependence of metacognition, attributions, and self-esteem. In B. F. Jones & L. Idol (Eds.), *Dimensions of thinking and cognitive instruction* (pp. 53-92). Hillsdale, NJ: Erlbaum.
- Bridge, C. (1989). Beyond the basal in beginning reading. In P. Winograd, K. Wixson, & M. Lipson (Eds.), *Improving basal reading instruction* (pp. 177-209). New York: Teachers College Press.
- Brown, A. L. (1978). Knowing when, where, and how to remember: A problem of metacognition. In R. Glaser (Ed.), *Advances in instructional psychology* (Vol. 1, pp. 55-113). Hillsdale, NJ: Erlbaum.
- Brown, A. L., Bransford, J. D., Ferrara, R. A., & Campione, J. C. (1983). Learning, remembering, and understanding. In J. H. Flavell & E. M. Markman (Eds.), *Carmichael's manual of child psychology* (Vol. 1, pp. 77-166). New York: Wiley.
- Brown, A. L., & Smiley, S. S. (1978). The development of strategies for studying texts. *Child Development*, 49, 1076-1088.
- Butkowsky, I. S., & Willows, D. M. (1980). Cognitive-motivational characteristics of children varying in reading ability: Evidence for learned helplessness in poor readers. *Journal of Educational Psychology*, 72(3), 408-422.
- Corno, L., & Mandinach, E. (1983). The role of cognitive engagement in classroom learning and motivation. *Educational Psychologist*, 18(2), 88-108.
- Costa, A. (1984). Mediating the metacognitive. *Educational Leadership*, 42(3), 57-62.

LEARNING FOR A LIFETIME

- Courtenay, B. (1989). *The power of one*. New York: Balantine.
- Covington, M. V. (1983). Motivated cognitions. In S. M. Paris, G. M. Olson, & H. W. Stevenson (Eds.), *Learning and motivation in the classroom* (pp. 139-163). Hillsdale, NJ: Erlbaum.
- Csikszentmihalyi, M. (1985). *Beyond boredom and anxiety*. San Francisco: Jossey-Bass.
- Csikszentmihalyi, M., & McCormack, J. (1986). The influence of teachers. *Phi Delta Kappan*, 67(6), 415-419.
- Cullinan, B. E. (1987). Inviting readers to literature. In B. E. Cullinan (Ed.), *Children's literature in the reading program* (pp. 2-14). Newark, DE: International Reading Association.
- Cunningham, P. M., Moore, S. A., Cunningham, J. W., & Moore, D. W. (1989). *Reading in elementary classrooms: Strategies and observations* (2nd ed.). New York: Longman.
- Dewitz, P., Carr, E., & Patberg, J. (1987). Effects of inference training on comprehension and comprehension monitoring. *Reading Research Quarterly*, 22(1), 99-121.
- Dillion, D. (1989). Showing them that I want them to learn and that I care about who they are: A microethnography of the social organization of a secondary low-track English-reading classroom. *American Educational Research Journal*, 26(2), 227-260.
- Duffy, G. D., Roehler, L. R., & Hermann, B. A. (1988). Modeling mental processes helps poor readers become strategic readers. *The Reading Teacher*, 41(8), 762-767.
- Duffy, G. D., Roehler, L. R., Meloth, M. S., Vavrus, L. G., Book, C., Putnam, J., & Wesselman, R. (1986). The relationship between explicit verbal explanations during reading skill instruction and student awareness and achievement: A study of reading teacher effects. *Reading Research Quarterly*, 21(3), 237-252.
- Durkin, D. (1978-79). What classroom observations reveal about reading comprehension instruction. *Reading Research Quarterly*, 14(4), 481-533.
- Flavell, J. H. (1978). Metacognitive development. In J. M. Scandura & C. J. Brainerd (Eds.), *Structural/process theories of complex human behavior* (pp. 213-245). The Netherlands: Sijthoff & Noordhoff.
- Flavell, J. H., & Wellman, H. M. (1977). Metamemory. In R. V. Kail, Jr. & J. W. Hagen (Eds.), *Perspectives on the development of memory and cognition* (pp. 3-33). Hillsdale, NJ: Erlbaum.
- Fleming, J., & Johnston, P. (1986, December). *Humor and play in the early acquisition of literacy*. Presented at the National Reading Conference, Austin, TX.
- Garner, R. (1987). *Metacognition and reading comprehension*. Norwood, NJ: Abex.
- Garner, R., & Kraus, C. (1981-82). Good and poor comprehenders' differences in knowing and regulating reading behaviors. *Educational Research Quarterly*, 6(4), 5-12.
- Gaskins, I. W. (1988). Teachers as thinking coaches: Creating strategic learners and problem solvers. *Reading, Writing, and Learning Disabilities*, 4(1), 35-48.
- Gaskins, I. W., & Elliot, T. T. (1991). *Implementing cognitive strategy training across the school: A how-to manual for teachers*. Cambridge, MA: Brookline Books.
- Ghatala, E., Levin, J., Pressley, M., & Lodico, M. (1985). Training cognitive strategy monitoring in children. *American Educational Research Journal*, 22(2), 199-216.
- Graves, D. (1983). *Writing: Teachers and children at work*. Exeter, NH: Heinemann.
- Haney, W., & Madaus, G. (1989). Searching for alternatives to standardized tests: Whys, whats, and whithers. *Phi Delta Kappan*, 70, 683-687.
- Hansen, J. (1987). *When writers read*. Portsmouth, NH: Heinemann.
- Holt, J. (1964). *How children fail*. New York: Pitman.
- Johnston, P. (1989). Constructive evaluation and the improvement of teaching and learning. *Teachers College Record*, 90, 509-528.
- Johnston, P. (1984). Assessment in reading: The emperor has no clothes. In P. D. Pearson, M. Kamil, R. Barr, & P. Mosenthal (Eds.), *Handbook of reading research* (pp. 147-182). New York: Longman.
- Johnston, P. H., & Winograd, P. N. (1985). Passive failure in reading. *Journal of Reading Behavior*, 17(4), 279-301.
- Jones, B., & Idol, L. (Eds.). (1990). *Dimensions of thinking and cognitive instruction*. Hillsdale, NJ: Erlbaum.

- Kohn, A. (1991). Group grade grubbing versus cooperative learning. *Educational Leadership*, 48(5), 83-88.
- Kreutzer, M. A., Leonard, C., & Flavell, J. H. (1975). An interview study of children's knowledge about memory. *Monographs of the Society for Research in Child Development*, 40 (1, Serial No. 159).
- Lepper, M. R., & Green, D. (1978). *The hidden costs of reward*. Hillsdale, NJ: Erlbaum.
- Lytte, S., & Botel, M. (1988). PCRP II: *Reading, writing and talking across the curriculum*. Philadelphia, PA: Pennsylvania Department of Education.
- Mahr, M. (1983). On doing well in science: Why Johnny no longer excels; why Sarah never did. In S. Paris, G. Olson, & H. Stevenson (Eds.), *Learning and motivation in the classroom* (pp. 179-209). Hillsdale, NJ: Erlbaum.
- Mann, D. (1986). Can we help dropouts: Thinking about the undoable. *Teachers College Record*, 87(2), 307-323.
- McCormick, S. (1977). Should you read aloud to your children? *Language Arts*, 54(2), 139-143.
- Morrow, L. M. (1989a). Creating a bridge to children's literature. In P. Winograd, K. Wixson, & M. Lipson (Eds.), *Improving basal reading instruction* (pp. 210-230). New York: Teachers College Press.
- Morrow, L. M. (1989b). *Literacy development in the early years: Helping children learn to read and write*. Englewood Cliffs, NJ: Prentice Hall.
- Morrow, L. (1982). Relationships between literature programs, library corner designs, and children's use of literature. *Journal of Educational Research*, 76(4), 221-230.
- Morrow, L., & Weinstein, C. (1986). Encouraging voluntary reading. The impact of a literature program on children's use of library centers. *Reading Research Quarterly*, 21(3), 330-346.
- Nicholls, J. (1989). *The competitive ethos and democratic education*. Cambridge, MA: Harvard University Press.
- Nicholls, J. (1983). Conceptions of ability and achievement motivation: A theory and its implications for education. In S. Paris, G. Olson, & H. Stevenson (Eds.), *Learning and motivation in the classroom* (pp. 211-237). Hillsdale, NJ: Erlbaum.
- Palincsar, A. S., & Brown, A. (1986). Interactive teaching to promote independent learning from text. *The Reading Teacher*, 39, 771-777.
- Palincsar, A., Ransom, K., & Derber, S. (1989). Collaborative research and development of reciprocal teaching. *Educational Leadership*, 46(8), 37-41.
- Pappas, C., Kiefer, B., & Levstik, L. (1990). *An integrated language perspective in the elementary schools*. New York: Longman.
- Paris, S. G., Cross, D., & Lipson, M. (1984). Informed strategies for learning: A program to improve children's reading awareness and comprehension. *Journal of Educational Psychology*, 76(6), 1239-1252.
- Paris, S., & Jacobs, J. (1984). The benefits of informed instruction of children's reading awareness and comprehension skills. *Child Development*, 55, 2083-2093.
- Paris, S. G., Lawton, T. A., & Turner, J. C. (in press). Reforming achievement testing to promote students' learning. In C. Collins, & J. Magieri (Eds.), *Learning in and out of school*. Hillsdale, NJ: Erlbaum.
- Paris, S. G., Lipson, M. Y., & Wixson, K. K. (1983). Becoming a strategic reader. *Contemporary Educational Psychology*, 8(3), 293-316.
- Paris, S., Wasik, B., & van der Westhuizen, G. (1988). Meta-metacognition: A review of research on metacognition and reading. In J. Readance & S. Baldwin (Eds.), *Dialogues in literacy research* (pp. 143-166). Chicago, IL: National Reading Conference.
- Paris, S. G., & Winograd, P. (1990). How metacognition can promote academic learning and instruction. In B. Jones & L. Idol (Eds.), *Dimensions of thinking and cognitive instruction* (pp. 15-52). Hillsdale, NJ: Erlbaum.
- Paulson, F., Paulson, P., & Meyer, C. (1991). What makes a portfolio a portfolio. *Educational Leadership*, 48(5), 60-64.
- Peterson, P., Fennema, E., & Carpenter, T. (1989). Using knowledge of how students think about mathematics. *Educational Leadership*, 46(4), 42-46.
- Pressley, M. Burkell, J., Cariglia-Bull, T., Lysynchuk, L., McGoldrick, J., Schneider, B., Snyder, B., Symon, S., & Woloshyn, V. (1990). *Cognitive instructional strategies that really work*. Cambridge, MA: Brookline Books.

LEARNING FOR A LIFETIME

- Rosenblatt, L. M. (1978). *The reader, the text, the poem*. Carbondale, IL: Southern Illinois University Press.
- Schunk, D. (1990). Goal setting and self-efficacy during self-regulated learning. *Educational Psychologist*, 25(1), 71-86.
- Segal, J., Chipman, S., & Glaser, R. (1985). *Thinking and learning skills, Vol. 1: Relating instruction to research*. Hillsdale, NJ: Erlbaum.
- Shannon, P. (1986). Teachers' and administrators' thoughts on changes in reading instruction within a merit pay program based on test scores. *Reading Research Quarterly*, 21(1), 20-35.
- Shepard, L. (1989). Why we need better assessments. *Educational Leadership*, 46(7), 4-9.
- Teale, W. H. (1982). Toward a theory of how children learn to read and write naturally. *Language Arts*, 59(6), 555-570.
- Tompkins, G. E., & Hoskisson, K. (1991). *Language Arts: Content and teaching strategies*. New York: Merrill.
- Trelease, J. (1989). *The new read-aloud handbook*. New York: Penguin.
- Valencia, S. (1990). A portfolio approach to classroom reading assessment. *The Reading Teacher*, 43(4), 338-340.
- Vygotsky, L. S. (1978). *Mind in society*. Cambridge, MA: Harvard University Press.
- Webb, N. (1982). Student interaction and learning in small groups. *Review of Educational Research*, 52(3), 421-445.
- Weinert, F., & Kluwe, R. (1987). *Metacognition, motivation, and understanding*. Hillsdale, NJ: Erlbaum.
- Weinstein, C., Goetz, E., & Alexander, P. (Eds.). (1988). *Learning and study strategies: Issues in assessment, instruction, and evaluation*. New York: Academic Press.
- Winograd, P., & Hare, V. C. (1988). Direct instruction of reading comprehension strategies: The nature of teacher explanation. In C. Weinstein, E. T. Goetz, & P. Alexander (Eds.), *Learning and study strategies: Issues in assessment, instruction, and evaluation* (pp. 121-140). New York: Academic Press.
- Winograd, P., & Johnston, P. (1982). Comprehension monitoring and the error detection paradigm. *Journal of Reading Behavior*, 14(1), 61-76.
- Winograd, P., & Smith, L. (1987). Improving the climate for reading comprehension instruction. *The Reading Teacher*, 41(3), 304-310.
- Winograd, P., Turner, T., & McCall, A. (1990, December). *Influential teachers and receptive students*. Paper presented at the National Reading Conference, Miami, FL.

REFLECTIVE TEACHER, REFLECTIVE LEARNER

Esther Fusco and Gwen Fountain

If the only tool you have is a hammer, everything begins to look like a nail—Abraham Maslow

The current frenzy of activity concerning schools focuses on improving instruction to reduce the high urban dropout rate and the reported thirteen percent functional illiteracy rate in the United States (Venezky, et al., 1990, p. 5). While the debate seems to center around the use of various technologies in the classroom and changing school management structures, there are other less dynamic yet sound research methods that we as teachers can incorporate into our programs to improve the quality of education classroom by classroom.

Where can the classroom teacher look to find a way to make education more effective? Dewey, as early as 1938, proposed that classroom teachers move away from simply presenting learning as an unconnected, finished product to students. Rather, he said that true education is developed from within, through connected experiences. His message was that meaningful interaction between the learner and what is being learned is crucial and

that this must occur within a curriculum that has continuity and relevancy.

Piaget was another advocate of this perspective. For over sixty years, he conducted research about children that has implications for classroom instruction. If teachers apply Piaget's theory of constructivism, which means that knowledge is conducted by students, then teachers will see these students actively engaged in meaningful learning. Piaget's extensive work has influenced the research of others, such as Resnick, Glaser, Flavell, and Hunt. Reading the work of these present-day researchers, who are concerned with the development of "cognitive competencies," teachers hear the same refrain: For real learning to occur, students must be actively engaged in learning experiences that connect to their present knowledge and bridge to structures needed for future learning (Resnick, 1987, p. 6).

For many years, we have worked to develop instructional programs based on the constructivist philosophy of learning. From our experiences, we believe that effective daily instruction rests on this philosophy and is demonstrated by the cognitive and affective components described in this approach. Embedded in a program that supports

these notions are a variety of metacognitive strategies that promote reflection on student and teacher actions.

METACOGNITION

What is metacognition? According to Flavell, metacognition refers to one's knowledge concerning one's own cognitive processes and products or anything related to them (cited in Resnick, 1976, p. 232). The ability to know and understand their own cognitive processes enables learners to manipulate and organize their learning situations. Metacognition involves the monitoring and control of attitudes, such as students' beliefs about themselves, the value of persistence, the nature of work, and their personal responsibility in accomplishing a goal. These attitudes are vital to success in academic and nonacademic tasks (Marzano, et al., 1988). This self-awareness also facilitates the development of competency and problem-solving skills within an individual (Schoenfeld, 1985). According to Piaget, such ability encourages the learner to use knowledge more productively:

What knowledge really consists of is not just the acquisition and accumulation of information, since that alone would remain inert and sightless, as it were. But knowledge organizes and regulates this information by means of auto-control systems directed toward adaptation, in other words, toward the solving of its problems. (1971, p. 61)

We believe this self-knowledge specifically supports the understanding of concept development because we believe it promotes the active processing encouraged by Dewey, Flavell, and Schoenfeld. It has been important to incorporate a variety of metacognitive strategies in our instruction to support students' knowledge acquisition and the different types of information-processing demands placed on them during a lesson. Further, studies indicate that incorporating metacognitive skills into instructional programs can produce skills that generalize across content (Palincsar & Brown, 1984; Paris & Jacobs, 1984). Our interest in the role of metacognition in the learning process has encouraged us to work closely with students, ob-

serving the results of their use of metacognitive processing and its effect on their cognitive processing. Our thesis is that unless these self-reflective strategies become a part of daily classroom tools, there is little chance that they will become students' strategies. With these strategies we believe students will be better able to self-regulate their learning and thus can improve their performance in reading, learning, and remembering (Weinert, 1987, p. 9). The distinction and importance in utilizing these strategies is reinforced by Flavell, who alludes to the thinking of a student engaged in the process:

You sense that you do not yet know a certain chapter in your test well enough to pass tomorrow's exam (metacognitive strategy . . .) . . . You wonder if you understand the chapter well enough to pass tomorrow's exam (metacognitive experience), so you try to find out by asking yourself questions about it and noting how well you are able to answer them (metacognitive strategy . . .). Cognitive strategies are invoked to make cognitive progress, metacognitive strategies to monitor it. (1979, p. 908)

METACOGNITIVE STRATEGIES

If metacognitive strategies help students control their cognitive processes, learn, and effectively solve problems, then what skills promote the acquisition of these strategies? There are a variety of strategies that promote metacognitive knowledge. In this chapter, we focus on several strategies. We have used them successfully with students and teachers and have seen the positive growth in metacognitive knowledge that occurs as teachers and students carefully walk through and learn to use them. The strategies include the following:

- wait time
- metacognitive questions
- listening strategies
- visualization strategies
- writing strategies
- collaborative group strategies
- problem-solving strategies

Wait Time

For more than twenty years, Mary Budd Rowe has done research related to "wait time." Wait time is the amount of time a student is given to reflect between the teacher's question and the actual response. Rowe reports that the teacher's willingness during discussions to give students time to think before responding greatly effects the quality of their responses. She stated:

Under a wide variety of instructional situations and levels ranging from first grade through university level, from classrooms to museum and business settings, the quality of discourse can be markedly improved by increasing to three seconds or longer the average wait times used by teachers after a question and after a response. These pauses are ordinarily so brief, one second or less on the average, that an adequate exchange of ideas and the nurturing of new ideas cannot take place. (1987, p. 43)

If, however, the teacher asks a question, then pauses to allow students time to respond, and then pauses again before responding to the students' responses, students gain greater control over their thoughts. In such an environment, the quality of responses improves and failures to respond decrease as does the need for discipline (Rowe, 1987, p. 40).

However, using wait time is not easy to do if a teacher has previously valued material coverage rather than student learning. It is much faster and easier for teachers to ask a question, answer it themselves, and go on rather than allow students time to think. Three seconds can seem like a very long time. Teachers must reflect on what is really important in the learning process. Is it student engagement and reflection or is it the amount of topical material covered by the teacher? We, of course, believe that student reflection is equally important in the long run. This belief is demonstrated in an interaction in Ms. Kaplowitz's first grade class.

Math Example

This conversation occurred in a first grade class that I visited on the 100th Day of School. I was looking at the students' 100 Day Projects. Adam had brought in 100 pennies.

DR. FUSCO: I could use Adam's 100 pennies to buy ice cream.

ADAM: Imagine if you had 100 quarters.

TRAVIS: You could buy a lot of ice cream.

ADAM: How many dollars would you have if you had 100 quarters?

DR. FUSCO: Well how many quarters make a dollar?

TRAVIS: Four.

DR. FUSCO: If you know that, can you use that information to figure out how many dollars 100 quarters make?

TRAVIS: I could draw ten sticks for \$10 and put four quarters next to them.

DR. FUSCO: How many quarters will \$10 make?

TRAVIS: (Draws forty quarters.)

DR. FUSCO: Now what will you do?

TRAVIS: I could draw \$10 more. But I know it would be forty quarters more because I already did that.

DR. FUSCO: How many dollars will that make?

TRAVIS: Eighty quarters make \$20.

DR. FUSCO: How did you figure that out, Travis?

TRAVIS: Easy, $10 + 10 = 20$ and $4 + 4 = 8$ so $40 + 40 = 80$.

DR. FUSCO: Well, now you know that eighty quarters make \$20. (Going to the 100 chart.) You have used 80 of the 100. How many quarters do you have left?

TRAVIS: (Counting softly by tens.) Twenty.

DR. FUSCO: Would you draw \$10 more?

TRAVIS: (Pausing and thinking) No, it is too many.

DR. FUSCO: How do you know that?

TRAVIS: Because forty is more than twenty and we used forty for \$10.

DR. FUSCO: So what will you do now?

TRAVIS: I could draw more dollars and count the number of quarters, or I could (pauses and thinks).

DR. FUSCO: You could do what?

TRAVIS: (Shouts) It's \$5 and then (pauses) it's \$25.

DR. FUSCO: How did you figure that out?

METACOGNITIVE QUESTIONS	
QUESTIONS	PROCESS
1. What am I doing?	1. Create a focus (access short-term memory)
2. Why am I doing it?	2. Establish a purpose
3. Why is it important?	3. Create reason(s) for doing it
4. How/Where does it fit in with what I already know?	4. Recognize appropriate context or interrelationships or analogous situations
5. What questions do I have?	5. Discover what is still unknown
6. Do I need a specific plan to understand or learn about this?	6. Design a possible structure or method of approaching the topic
7. How may I use this information in other areas of my life?	7. Consider application to other situations (further connect into long-term memory)
8. How effective have I been in this process?	8. Evaluate progress
9. Do I need to do more?	9. Monitor need for further action

Figure 1 Questions to Enhance Metacognitive Processing

TRAVIS: Because five and five make ten and twenty and twenty make forty.

DR. FUSCO: So why is that \$5 more?

TRAVIS: Because twenty and twenty are forty quarters and that's half of the eighty we used. Half of \$20 is \$10 and half of \$10 is \$5.

DR. FUSCO: So, how many dollars does 100 quarters make?

TRAVIS: That makes \$25, and that is a lot of dollars.

This exchange represents engagement and reflection as Travis worked to solve the question he posed. As an exemplar, it speaks to our responsibility for asking real questions—questions that merit wait time, student engagement, and reflection. These kinds of questions take more reflection, consideration, and planning on our part. Yet the rewards of such efforts are great. As the student reflects on a response, the teacher also has time to think. Thus, teachers and students engage in a series of questions and responses that probe, elaborate, and foster application of the concept.

Through this process, teachers become more skillful in using inquiry and improve their questions. They move away from rote questioning to higher-order thinking since they are now engaged in a process calling for memory, analysis, counter examples, and evaluation.

As we observed teachers asking better questions and students pausing to reflect, we realized that many students were unsure of what to do while they waited. Thus, we developed a series of questions for students to consider during this waiting time. In Figure 1 are questions designed to enhance metacognitive processing at any grade level.

These questions were designed to be organized prompts for students to use in developing their self-regulation for any learning activity. In a more specific sense, they can be used to organize a response while "waiting" during wait time. For example, a history teacher during a discussion of the Revolutionary War might ask, "What parallels can you draw between our Revolutionary War and the current Baltic uprisings?" The student's thought process might proceed as follows:

What am I doing?—comparing the Revolutionary War with Baltic uprisings

Why am I doing it?—to connect today's events with our past history

Why is it important?—to understand current events, see how history repeats itself, and see universality of issues

How does it fit?—know about American Revolution, know Baltic-Soviet relations, what issues are the same? different?

Knowledge of these structured probes helps the student better organize a response and ask additional questions about factual information needed to assess the teacher's question.

Our experience has been that teaching students these questions helps them formulate better oral and written responses to complex questions. Use of these questions has also supported better student study skills and general problem solving (Fountain & Fusco, 1987).

In our teaching, we have found that by incorporating some of these questions into our lesson planning, we focus better on the important concepts to be developed and provide more appropriate activities to support students' learning (Fountain & Fusco, 1987). Therefore, we find that these questions can aid both teachers and students in their self-regulation, organization, and thus their learning. Cynthia Stewart, an Indianapolis public school teacher who uses metacognitive questions, wrote in her journal: "I feel they help me to clarify what I should be teaching. It is a skill that helps me and the children focus our thinking. I think this strategy will carry over to other aspects of our daily living, including our personal skills."

Listening Strategies

Listening is a critical component of thinking and language comprehension. It is the most used channel for learning because it receives and forwards so many messages to the brain. "It is difficult to separate out the skills specific to listening from the skills specific to thinking, because the entire receptive process is so very integrated in the cortex. It is use-

ful, however, to view listening as a complete, ongoing process in order to devise strategies that allow us to enhance the skills involved" (Wolvin, 1983, p. 14).

Though schools spend very little time developing listening skills, we do know that we listen more than we speak, read, or write. When our students attentively listen, they are better able to function and communicate with others. As a skill, listening involves receiving, attending, organizing, understanding, interpreting, and evaluating messages from the environment.

The components of listening may be thought to fall along a bipolar continuum. At one end is a mental state characterized by receptivity to others, alertness to external stimuli, acceptance of messages, and an openness to input. In this state the listener is attuned entirely to the speaker, giving full attention to the messages being received and imposing her or his own point of view only minimally. The key element at this point is attentiveness, i.e., maintaining an external focus only on the speaker and on the message being transmitted.

In the middle of the continuum is a state in which the listener is more actively selecting and organizing the material being received. Mentally the listener is trying to distinguish what information is most essential to the speaker's message, what information is most personally relevant, and how the concepts presented are interrelated. The focus here is on understanding the message.

At the far end of the continuum, the listener is weighing the message against personal beliefs, questioning the speaker's motives, challenging the ideas presented, suspecting the validity of the message, holding the speaker's ideas up to standards of excellence, wondering what has been omitted, thinking how the message could have been improved, and in other ways evaluating what is being said." (Friedman, 1986, p. 7)

All of these processes require active involvement on the part of the individual listener. We believe it is important to develop students' listening because this skill serves as a key factor in all metacognitive

processing. Our instruction in listening is first directed toward supporting students in understanding the role listening plays in thinking. We begin our instruction by creating activities that enable students to discover the importance of focusing their listening. As they focus, they develop an awareness that listening is continually influenced by a variety of filters, including but not limited to their value system, prior experiences, feelings, and interests. As our students become aware of these filters while attending to incoming messages, they begin to understand that they can control or do something constructive with the messages. Should they just be taking in the message or organizing it, or is there something in the message that needs to be understood? As our students become aware of the power in their listening, we include additional activities that help them refine their listening strategies. Students begin to recognize that their listening can be managed or analyzed. What we have noticed is that, as students stop and listen more carefully, they can determine the level of listening required and begin to more effectively direct the messages they receive. Listening then becomes a strong metacognitive process because students recognize that listening enables them to effectively organize data and create informational connections.

When effectively listening, students go through a ten-step process described by Sara Lundsteen. It includes both physiological and analytical activities: (1) hear, (2) hold in memory, (3) attend, (4) form images, (5) search the past store of ideas, (6) compare, (7) test the cues, (8) recode, (9) get meaning, and (10) intellectualize beyond the listening moment (1979, p. 18). We review these steps with students in grade three and higher. We truncate the form using the acronym "HASTE," (h)ear, (a)ttend, (s)earch for meaning, (t)ake beyond, (c)ote/react.

When students reach the final steps in the listening process, they are knowingly sorting the message. They decide whether it should be connected to an old idea, reorganized as part of a new category, or reacted to as a part of a new situational response. By having students formally consider what to do with the information they receive from

listening, teachers build students' metacognitive skills.

Although being aware of and decoding the message heard are the essential components of our instructional program in listening, we also include strategies that encourage students to listen and reflect on both the verbal and nonverbal meaning of spoken words. Students need to consider body language when they are listening. Bena Kallick (1991) developed a wonderful charting strategy to introduce students to the importance of nonverbal cues while listening. It is especially useful as students engage in collaborative work. The activity requires having participants work in groups with a process observer. The process observer records group members' answers to the following questions:

<i>What do we see when someone's listening?</i>	<i>What do we hear when someone's listening?</i>

Listening purposefully for verbal and nonverbal cues helps students of all ages control their impulsivity and thus increases their chances of determining the relevance of the message being received. Listening, when using the metacognitive questions discussed earlier, invites the listener to categorize the message: "Why am I listening?" "Do I agree or disagree with the message?" "Is this data part of an important idea or a detail that is not important?" "Does this message fit with my previous knowledge or belief, or is it a contradiction?" We believe that this proactive listening and questioning by the listeners builds their self-concepts as they feel engaged and empowered by their activity.

Using listening as a metacognitive skill enables students to focus more effectively on messages, to examine the messages, and to take control of the messages once received. This process is powerful. It enables the learner to develop better communication skills as data is sorted and stored for future use.

A simple way to have students consider their listening skills is to have them reflect on how they listen in a variety of situations. We have used the following inventory of questions to assess our students' listening:

- When I feel anxious, my listening is . . .
- When someone lectures, my listening is . . .
- When I take notes, my listening is . . .
- When I am not rushed, my listening is . . .
- When I know the speaker, my listening is . . .
- When I am tired, my listening is . . .
- When someone talks too long, my listening is . . .
- When I cannot see the person speaking, my listening is . . .
- When someone maintains eye contact, my listening is . . .
- When I am interested in the topic, my listening is . . .

These questions are a means for initiating discussions about listening. By supplementing them with the HASTE strategy and Kallick's charting of nonverbal listening cues, students can become more reflective listeners.

Visual Imagery

Visual imagery, the ability to create pictures in the mind, is an often neglected skill in educational programs. Yet, through visual imagery, students can mentally rehearse solving a problem in math or think through a class presentation about a book they just completed. "Guided imagery is one of the most powerful tools we have for understanding intelligence and harnessing the seemingly unlimited capabilities of the mind" (Gaylean, 1983, p. 19).

As a skill, visual imagery enables students to see a situation anew or to practice a task in the safe environment of their minds. When teachers use imagery, they expand students' abilities to imagine details, think through a problem, and develop association techniques—all of which improve students' memory. When practiced regularly, students can use visualization to find divergent options for solving a problem. Strengthening these abilities enables students to establish another form of ongoing monitoring skills, thus giving them greater metacognitive control over their thought processes.

Teachers can use visual imagery to create the sense of an experience even if a student has not had the experience in real life. With guided practice, the teacher can assist students in creatively visualizing a beach, a dinosaur, or Abraham Lincoln right in their classroom. With children who experience difficulty in learning, visual imagery can be a powerful tool. It can enable these students to become more relaxed and open to positive learning experiences. For example, students can imagine themselves successfully engaged in reading tasks that usually cause them difficulty. Repeated practice with such impressions can change students' self-perceptions since they can visualize themselves receiving information, interpreting information, and drawing conclusions in a positive manner.

Visual imagery needs guidance and practice with topics that connect to students' experiences. When using the strategy, the teacher can work through the various stages of visualization: (1) impressions, (2) associative process, and (3) interrelationship processes (Bagley and Hess, 1987, p. 14). Students progress through these stages with practice and in so doing develop their sensory awareness. As students work through these stages, their ability to concentrate also improves.

Mind Mapping

A popular metacognitive strategy is "mind mapping," also referred to as cognitive mapping, semantic webbing, or clustering. Regardless of the name, the process is the same. The student or teacher begins with a main idea or concept, generates information from prior knowledge, and organizes the information into a usable form.

As a cognitive skill, mapping enhances students' ability to retrieve information and to organize it more effectively. Mapping fosters creativity and appeals to different learning styles. It is a strategy that Dewey or Piaget could endorse because it unleashes potential by promoting the unrestricted flow of thoughts and ideas in an environment of active listening. Mapping encourages children to organize their own learning. While there are no strictly defined rules for mapping, Buckley and

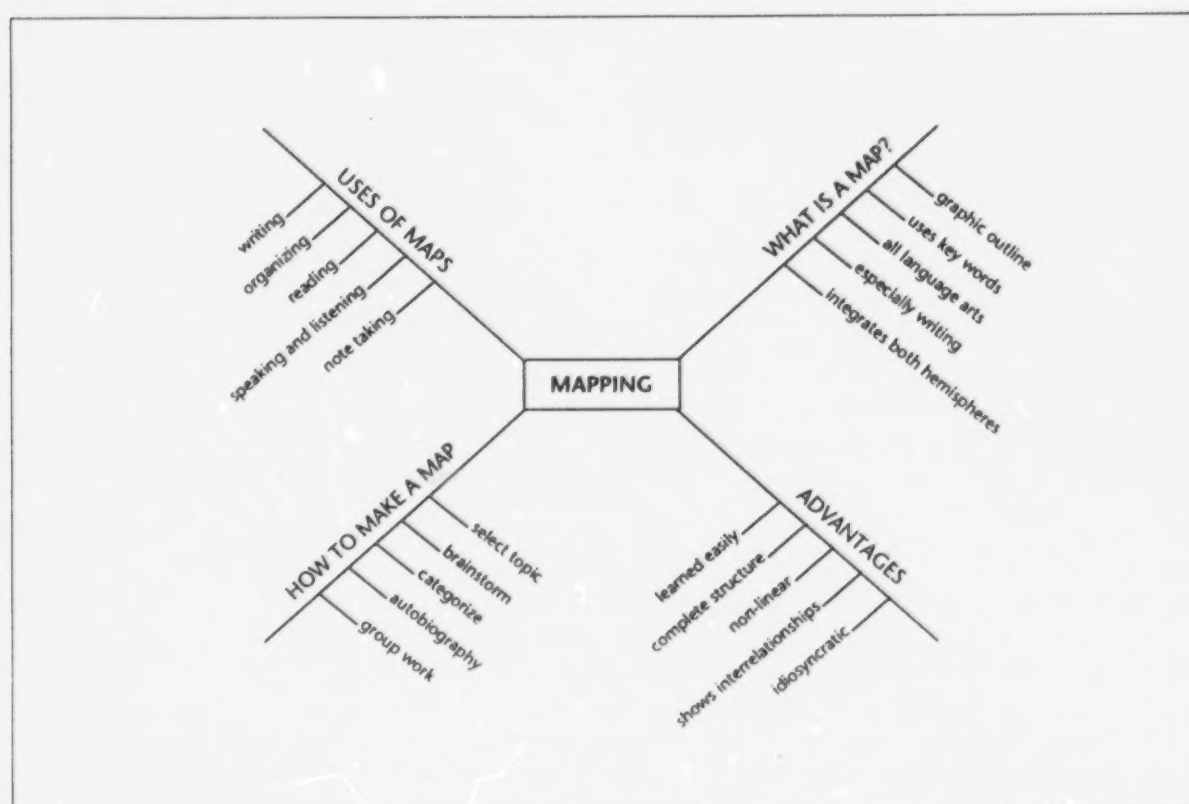


Figure 2 Mind Mapping

Boyle suggest certain steps in making a map, for example when beginning an essay. This general pattern below can be followed whenever a map is used (see Figure 2).

Mapping is a cognitive skill, which like other cognitive skills, improves with practice. It can be used to assess or develop knowledge, gather resources from a group, take notes, or capture an overall impression. It helps learners get beyond the surface as they generate ideas, identify points, and gather information related to a topic.

Mapping has become a very popular technique because the teacher or student can use words and pictures to connect ideas. Mapping enhances recognition of the scope of an idea and promotes visual thinking. Since mapping is a generative skill, it allows the teacher or student to deal with lots of information. Once generated, the information can be used merely as notes or to form an outline for writing, speaking, or planning.

Mapping helps individuals frame and focus their ideas. In reviewing a map, individuals develop a new perspective and often see new relationships between the ideas. As a strategy for writing, mapping enables the user to be more expressive, more descriptive, and more informative since they generate many attributes of a concept. Mapping supports the user's metacognitive development because it encourages persistence as one pushes to generate alternatives or details for the map. It also builds competencies in monitoring and control because the user visually creates and effectively accesses knowledge. The user feels success as the map is translated into use.

Cheryl Guindon, a first grade public school teacher in Indianapolis, Indiana, uses mapping to help her students cognitively preassess their learning of a theme they are about to study. She has the students share all the ideas they have on the topic. Together they map the information. They then co-

operatively decide what additional information they want to learn. As they proceed with the lesson, the students check the accuracy of their initial ideas and see if they are learning the desired information. This use of mapping helps students reflect on and monitor their knowledge development. It engages and focuses their learning while also building a positive attitude toward learning. Guindon's students feel proud of what they know before they start and are prouder still of what they add to their store of knowledge during the lessons.

Writing

Writing as a reflective strategy can be effectively employed in grades kindergarten through college. The successful use of this tool has been strengthened by the National Writing Project. This project encouraged writers to reflect on their writing and reveal the patterns used in thinking through their ideas. Such reflective thinking offers greater insight into the writing process and improves students' abilities to write in a comprehensive, coherent style. Writing as a way of reflecting has long been used by people who keep diaries to track their lives or to reflect on what is occurring, what is known, or what is about to be revealed. In using writing as a reflective process, students should write as if they were speaking or having a conversation. Teachers should use the writing to improve students' thinking and should avoid violating students' right to privacy.

In his book *The New Diary*, Tristine Rainer (1978) reviewed four methods for journal writing—description, catharsis, free-intuitive writing, and reflection. Rainer viewed reflection as an opportunity to step back and ask yourself some questions. Teachers can use questions after each lesson, unit, or at the end of each day. The questions may be kept in a learning log, a journal, or on a piece of paper. Successful questions we have used with students and teachers for consistent reflective writing include the following:

What did I learn?

How can I use it?

What questions do I still have?

These questions are based on the metacognitive questions used during wait time. Teachers who use

these questioning techniques discuss with students how the wait time questions and the writing questions are alike and how they are related.

In our work with students and teachers at Babylon Elementary School in Babylon, New York, stepping back and asking questions helps writers focus and consider the subject or circumstances in a more systematic manner. For example, in Anita Todd's first grade class, students list what they have learned each day. Mary Quinn, another first grade teacher, has students keep a daily log. At the end of each day the children reflect on the day and write about what they have learned. At first, many of the children can only draw pictures of what they have learned. But as the year progresses, the pictures turn to letters and the letters evolve into words. Figure 3 is an example of a log.

Another Babylon first grade teacher, Marjorie Hauck, also uses learning logs. Students in her classroom write in their learning logs when they want to reflect on something they feel is important or demonstrates what they have learned. The logs that Hauck, Todd, and Quinn keep are variations for encouraging student reflection. These methods for elementary students are evolutionary assessments as well as practical stimulants for beginning or reluctant writers.

Rainer's book also describes seven techniques for writing in journals—lists, portraits, guided imagery, dialogues, unsent letters, maps of consciousness, and altered points of views. Using these methods in the classroom depends on the needs of the writers and the purpose of the reflection. Once students understand each of these techniques they can use them as needed to understand their learning. This view is elaborated by Toby Fulwiler in his book *The Journal Book*:

When people write about something, they learn it better. That, in a nutshell, is the idea behind asking students to keep journals. While some of us who assign these personal notebooks might argue about what they should be called—logs, learning logs, day-books, thinkbooks, dialectical notebooks, field notebooks, diaries, whatever—we would not disagree about their purpose and value: writing helps our students learn things better and these notebooks

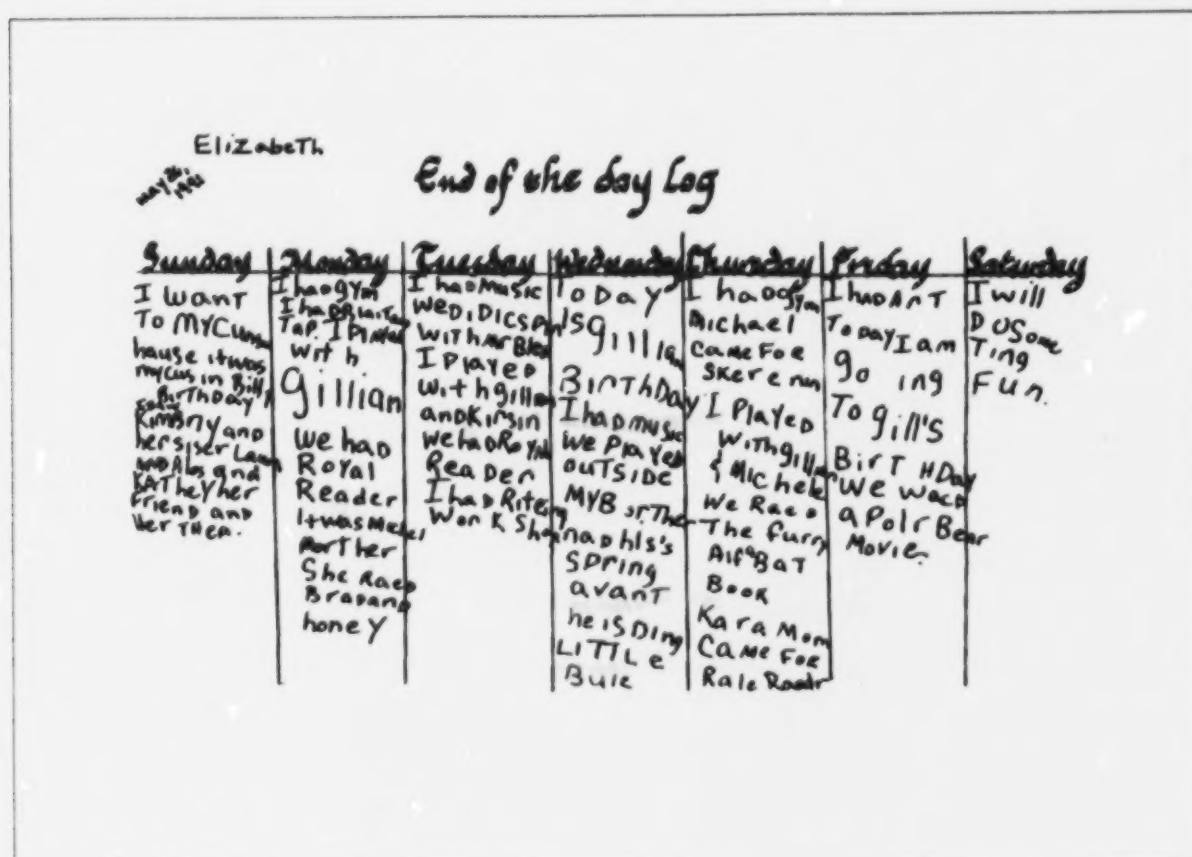


Figure 3 Elizabeth's Log

provide a place in which to write informally yet systematically in order to seek, discover, speculate, and figure things out. (1987, p. 9)

Journals can also be used more formally as an assessment strategy during the learning experience. Fountain (in press) uses journal writing throughout the development of a lesson to assess student learning. Initial writing assesses "where the students are" in relationship to the concepts of the lesson. This "preteaching" assessment taps into students' prior experiences by asking them: "What examples can you think of for ___?" "If you were going to explain ___ to someone, what would you say?" "Write down all the words that come to mind when you hear ___".

During the lesson, after students have been working with the ideas for awhile, it is helpful to assess students' understanding of the concepts. In

assessing what students now know, the teacher can seek student feedback: "List three new ideas you have about ___" "Tell how your thinking about ___ has changed." "Think of examples in your life situation of ___; now think of nonexamples of ___."

This feedback during the lesson gives the teacher direction as to what to do next based on where the students are in their level of sophistication with the lesson ideas. Reflective writing gives students an opportunity to assist where they are in the process relative to a concept and to consider what they still need to know.

Finally, in order to determine whether students understand the ideas in the lesson, students are asked to use the concepts in meaningful situations. Teachers can then assess students' abilities to reflectively apply the concepts: "Write about at least two ways you could use what you have learned

about ____ in your daily life." "Write about at least one place or time in which it would not be appropriate to use ____." "If you were trying to determine if someone understands ____, what questions would you ask him or her?"

By using reflective journals to assess students' progress through their lessons, teachers encourage student reflection. Reflective journals also provide a valuable record for both the teacher and student, documenting students' learning over time.

While students write about their learning, so too should teachers and principals. Teachers and the principal at Babylon Elementary School have begun to reflect on their practices. It is a slow process; all have found it hard to write. But in their writing they have discovered that using a journal helps keep a focus on the goals established for the year. It also enables them to see the progress they have made. This reflective writing process supports teachers and principals in moving forward more effectively because it serves as a guide to the past and a place to dream about the future. It is hard to decide why this occurs, but it does. A group of science teachers in Wiltshire, in the United Kingdom, have also noted the importance of school journals. They listed the following benefits of keeping journals:

- They enable pupils to collect ideas and information together before they embark on a continuous piece of writing.
- They help pupils "rediscover" the information that they have already taken in.
- They help pupils come up with their own questions about what they still need to find out.
- They allow pupils to express their feelings about the work they have been doing with honesty to the teacher.
- They make two kinds of internal conversations possible for the writer—a conversation with oneself, and a conversation with the teacher without the rest of the class hearing.
- They provide a pupil and the teacher a personal map of the pupil's progress by offering information for a detailed profile.

- The journal/log setting does not demand a special writing style; the learner is free to think on paper as the words come. For this reason, journals often carry a strong sense of the writer's voice in a way that more formal, transactional or product-oriented writing does not. (D'Arcy, 1987, p. 45)

COLLABORATIVE STRATEGIES

Our purpose in this section is to explore how working in groups both promotes reflection and the development of certain metacognitive skills. Here we define group to mean two or more students working together to achieve a common goal.

Think-Aloud

Whimbey and Lochhead (1986) designed the "think-aloud" problem-solving process so "you (can) make your thinking visible to other people so that they can observe your attack on a problem." (p. 22). In the think-aloud process, there is a problem solver and a listener. The problem-solving partner vocalizes as thoroughly as possible everything he or she is thinking or doing to solve the given problem. At the same time, the listening partner encourages the problem solver's articulation and asks questions when something is unclear. In using the think-aloud process, your partner learns the strategies you use and you are able to look more carefully at your own problem-solving abilities (Whimbey & Lochhead, 1986, p. 22).

Thus, this think-aloud strategy is a powerful means of supporting metacognitive processing by getting it out in the open in a relatively safe environment—that is, with only one other person listening. The role and attitude of the listener is crucial to this process. The listener must be actively involved, checking the accuracy of the problem solver and demanding continual vocalization (Whimbey & Lochhead, p. 28); yet, also creating a relationship of trust and acceptance between the partners. Thus, the strategy creates a positive environment for focusing on a comparison of thought processes.

Teachers can model this think-aloud strategy to students while solving problems, inviting the stu-

dents to take the role of the active listener. Students check their teacher's reasoning against models displayed in the classroom and demonstrate constant vocalization of the thinking. A teacher might also pair with a student as the "listener" during problem-solving lessons to support and assess the student's thinking processes. This helps teachers establish personal rapport with students as well as informally assess their progress.

An additional reflective step may be added by asking students to keep a journal as they use this think-aloud strategy. They might pair with another student for a math, history, or science unit and each day or each week write about their experience—for example, "In working with Joel I learned ____." By doing this, older students summarize and gain perspective on their metacognitive abilities and continually are reinforced in reflecting and focusing their thinking. Students become more aware of what they learn by working with others and develop an appreciation of alternative problem-solving strategies.

Cooperative Groups

The educational benefits of using cooperative group strategies is well documented. In this section we briefly address how these groups enhance student reflection and metacognition.

Similar to the think-aloud, cooperative group strategies also invite students to verbalize their personal thoughts to others. By exposing their thinking to others in a group, students not only articulate their thinking but also compare and contrast their thinking and information with others in the group. During discussion and sharing, new ideas are generated and old ideas are refined. Students may rehearse more before speaking to a group; and in groups there are more possibilities that someone's "stray idea" may stimulate new reflection. Thus, cooperative groups provide an even wider arena for refining thinking, learning new ways of approaching ideas, and building on either the convergent or divergent thinking in the group.

Processing is an important part of cooperative learning. Time is built in to the process to reflect on how the group operated together when dealing with its assignment. There is either an oral or writ-

ten assessment of what made the group successful and how it might improve the next time. Some teachers use elaborate checklists to monitor a group process while others use a "PMQ," a listing of the Pluses, Minuses, and Questions remaining about the group work. Other teachers simply ask students to complete sentences such as: "In our group we were successful at _____. I can improve our group work next time by _____." Whether elaborate or simple, this reflection on the successes and needed improvements helps groups assess together where they have been and how they can become more effective.

By reflecting on the group process, students also invariably consider their own roles in the group, what they learned from others in the group, and what they contributed to the group. Specific assignments can help formalize and focus these thoughts. Again, individual reactions to working in the group can be obtained using a structured processing sheet (see Figure 4) or by asking students to complete the following: "My contributions were _____. Next time I will _____. After working in my group, my thinking about _____ has changed in the following way _____."

Cooperative groups allow students to listen to each other's thinking, organize and share their own thinking, and build on their common experience. Cooperative groups add the opportunity for shared and individual reflection. Thus, students not only have the opportunity to understand how others learn during the group activity. They can also understand what and how they added to their own knowledge during the reflective debriefing process. When coupled with a reflective journal, such an activity enables the students to assess their own skills and to determine how they can improve them.

PROBLEM-SOLVING STRATEGIES

Most successful problem solvers use some structured method of organizing their problem-solving processes. Most effective problem solvers use a model containing the basic elements of identifying or diagnosing the problem, organizing information about the problem, generating alternative

REACTIONS TO DISCUSSION GROUP				
NAME: _____				
CLASS & SECTION (COLOR): _____				
DATE: _____ GROUP NAME: _____				
Instructions: Mark an "X" on the line above your response to the following questions.				
1. I felt that the group meeting(s) was (were):				
Excellent	Good	Average	Not so good	Bad
2. I felt that my participation in the group was:				
Very Good	Good	Average	Not very good	Bad
3. I felt I was able to contribute:				
A great Deal	Quite a lot	As much as I wanted	Not as much as I wanted	Nothing
4. My feelings during the group meeting(s) were mainly:				
Very Enjoyable	Pleasant	So-So	Unpleasant	Quite Unpleasant
5. I felt that I learned from the discussion:				
Very Much	Quite a bit	Some	Little	Nothing
•Remarks/Elaborations/Explanations				

Figure 4 Structured Processing Sheet

solution options, utilizing some overt criteria for choosing among these options, and monitoring the solution chosen. Some models are more elaborate, requiring more complex and refined steps, but most contain as a minimum these common elements (Brightman, 1980; Bransford & Stein, 1984; Fountain, in press; Wales, 1977).

Problem solving is an overt expression of metacognitive processing. As such, it requires both the internal use of metacognitive strategies as well as an outward manifestation that those strategies are being used. Thus, in problem solving, students and teachers expose the effectiveness of their metacognitive processes to public scrutiny.

Problem solving requires three forms of knowledge. Good problem solvers effectively gather

information related to the problem at hand (declarative knowledge or the "what" of problem solving); utilize a systematic approach to problem solving (procedural knowledge or the "how" of problem solving); and finally, they put their knowledge to work in a way related to the problem at hand (conditional knowledge or the "why" of problem solving).

Although problem solving requires several kinds of knowledge, the use of metacognitive or conditional knowledge in problem solving is so integral to the process that removing it to assess its importance is much like performing delicate surgery. This close connection between effective problem solving and metacognitive abilities is in fact an important reason why we are interested in supporting

better reflection in students. We want them to become better problem solvers. Researchers find that effective problem solvers use successful metacognitive procedures, while less effective problem solvers do not (Schoenfeld, 1979; Resnick, 1987).

Recognizing the Problem

In problem solving, the first step is recognizing that there is a problem. We come upon a challenging situation. There is an unsettling feeling. Something is not as we expected, and we begin to ask ourselves questions: "Why is this situation unsettling? What is different? What needs to be done?" As we either ask these questions or have a sense of disequilibrium, we make a decision about our need to be involved in the situation. We ask, "Is this important to me? Is this something I need to spend time on? Can I do something about this?" The strategies we use to make these focusing and accepting decisions help determine both whether we will engage with the issue and our level of engagement. By either explicitly or intuitively asking these kinds of questions, we begin to exert our control over the problem. Good problem solvers are aware that they are asking these questions. They have strategies and criteria for judging their level of involvement in the unsettling situation. Expert problem solvers make this decision almost automatically while others may actually run through some explicit decision process on paper or in their heads (Fountain, in press; Isaksen and Treffinger, 1985).

Gathering Information

After, or simultaneously with the decision to engage and focus on the unsettling situation, we begin to diagnose the problem and gather information about it. This is a stage of problem definition, contextualization, and general information gathering. We conduct a search for information from our past experience. We assess how the present situation is similar to others we have encountered. We may also gather some additional information. We place all of this information in useful and meaningful categories. During this phase of problem solving we are asking ourselves: "Why does this problem exist? What is the primary problem? Who's involved? What's involved?"

Generating Solutions

During the next phase of the problem-solving process, we generate potential ways of solving the problem. This is the point in the process at which we ask ourselves: "What are the possible options? How do I find them?" The questions we ask ourselves and how we mediate this process—whether we let ourselves "float free" and let any possibility surface through a creative immersion-incubation process, or whether we follow some more disciplined, generative strategy—determines the alternative solutions we consider. The mental constraints we create by the questions we ask in the problem-solving process—the metacognitive strategies we use to frame our options search—in effect also narrow our solutions. This is not surprising, but it is revealing. If teachers focus primarily on one or two strategies for generating options, then they give students a certain, indirect, and limited perspective for generating options. Reflective teachers will want to use more diverse methods, including listing attributes, reasoning by analogy, visual brainstorming, synectics or the creative sequence of immersion, incubation, illumination, and elaboration. The more variety of strategies used in this phase of the problem-solving process, the richer the potential solution options. The more of these exploration strategies teachers experience, the more options and flexibility they build into their metacognitive processing as well.

Making Choices

The choice phase of problem solving comes next. Here teachers ask themselves two levels of questions. The most obvious is, "Which option should I choose?" But behind this is really the question, "Why?" More specifically: "Which criteria should I use for deciding among the possibilities I have generated? Should I make my decision on the basis of what is the most reasonable within my budget or time constraint, or on the basis of what is most valuable to me and will have the most positive long-term effects on me and others?" These are not necessarily alternative choices. Teachers usually balance these along with other criteria in the choice process. Again, it is one's "control" or metacognitive abilities to sort, rank in importance

implicitly or explicitly, and then weigh the criteria against the solutions that separate successful from less successful problem solvers. Reflective teachers need to articulate their criteria for decision making as often and as clearly as possible so that their students develop these choice strategies. Making the criteria clear also shows students that making choices is not an arbitrary process but one centered on strategies they too can learn. Thus, teachers need to model a number of strategies as they make classroom decisions—for example, by making pro/con lists, rating ideas, and writing PMQs. By experiencing these strategies in action and learning them in a classroom context, students see their environment as less arbitrary and see themselves as having more control of their lives.

After people make a decision, they generally expect to do something with it. Thus, after deciding which option best solves a problem, we ask ourselves: "How can I put this into action? What should I do to make this happen?" This is also a two-stage process. First, teachers must plan how they are going to actualize their chosen solution, and then they need to do it. Again, a diversity of strategies gives a broader perspective. By encouraging students to use planning strategies, teachers help students think ahead and plan for contingencies, thus honing their metacognitive abilities and encouraging reflective practice.

Monitoring Solutions

The final phase of most models of problem solving involves some method of monitoring the solution once it has been activated. Here again, metacognitive questions frame the process: "What is happening? Is it what I wanted? Any discrepancies? Can I live with this, or do I need to make changes?" The process of monitoring, assessing, and modifying the actualized solution requires fairly sophisticated cognitive and metacognitive strategies. A person evaluates what is occurring against the expected outcome, looking for discrepancies and then assessing whether revisions are necessary or desired. This is a difficult, two-tiered comparison process. Reflective teachers need to model these comparisons in the classroom. There are many opportunities to do this when handing back graded

assignments. Teachers can point out to students that their grade is a comparison against some defined standard. Teachers also can have students assess situations in their environment against standards they generate. For example, students might articulate why they like certain kinds of music, clothing, or media stars—that is, note what their ideal criteria are. Then they can see why some and not others meet these criteria. These ideas can then be brought to bear on the monitoring done in the course of any problem-solving process.

As noted throughout our discussion, metacognitive processes form the cognitive bases for problem solving. The more teachers explicitly articulate their own metacognitive processes as they confront classroom-related problems and ideas, the more students will be aware of the power of these directing and framing processes. Teacher modeling and student usage of these strategies should assist students in making some of these strategies their own.

Effective problem solving requires that teachers' declarative, procedural, and conditional knowledge flow effortlessly into, around, and with others to solve problems. Teachers' metacognitive control centers triage their information, processes, and reflection as they attempt to solve problems. However, when teaching students how to solve problems, it is often the triaging control process that gets the least attention. Teachers explicitly teach strategies for finding information and the steps to follow in the problem-solving process. But students often fail to receive discussion on how to frame, focus, and monitor as they search and wind their way to a solution.

CONCLUSION

We began our discussion of metacognitive strategies by asking, "If metacognitive strategies can help students control their cognitive processes, learn, and effectively solve problems, then what skills promote the acquisition of these strategies?" We have focused on strategies we have used successfully with students to enhance their reflective abilities. We find that as teachers actively articulate and model reflective practices in their classrooms, students become more effective learners.

LEARNING FOR A LIFETIME

As educators, we are concerned with improving the quality of learning in our classrooms. We believe that by consciously using metacognitive

strategies in all areas of instruction, we can significantly add to the quality of our daily instruction.

REFERENCES

- Bagley, M. T., & Hess, K. (1987). *200 ways of using imagery in the classroom*. New York: Trillium Press.
- Bransford, J., & Stein, B. (1984). *The IDEAL problem solver*. New York: Freeman.
- Brightman, H. (1980). *Problem solving: A logical and creative approach*. Atlanta: Business Publishing Division, College of Business Administration.
- Buckley, M. H., & Boyle, O. (1981). *Mapping the writing journey*. Berkeley, CA: The Regents of the University of California.
- D'Arcy, P. (1987). Writing to learn. In T. Fulwiler (Ed.), *The journal book* (pp. 41-46). Portsmouth, NH: Heinemann Educational Books.
- Dewey, J. (1938). *Experience and education*. New York: Collier Books.
- Gaylean, B. C. (1983). *Mind sight*. Long Beach, CA: Zephyr Learning Materials.
- Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive developmental inquiry. *American Psychologist*, 34, 906-911.
- Fountain, G. (1991). The IDEA CHAIN strategies for creative problem solving. Manuscript submitted for publication.
- Fountain, G. (1990). Strategies for reflective assessment. *Proceedings for the International Society for Exploring Teaching Alternatives* (pp. 51-53), Boulder, CO.
- Fountain, G., & Fusco, E. (1991). A strategy to support metacognitive processing. In A. Costa (Ed.), *Developing minds* (pp. 255-258). Alexandria, VA: Association for Supervision and Curriculum Development.
- Fountain, G., & Fusco, E. (1987). *SPARCS for learning workshop notebook*. Indianapolis, IN: SPARCS for Learning.
- Friedman, P. G. (1986). *Listening processes: Attention, understanding, evaluation*. Washington, DC: National Education Association.
- Fulwiler, T. (1987). *The journal book*. Portsmouth, NH: Heinemann Educational Books.
- Isaksen, S., & Treffinger, D. (1985). *Creative problem solving: The basic course*. Buffalo, NY: Bearly Limited.
- Johnson, D., & Johnson, R. (1987). *Joining together*. (3rd ed.). Englewood Cliffs, NJ: Prentice-Hall.
- Johnson, D., & Johnson, R. (1987). *Learning together and alone* (2nd ed.). Englewood Cliffs, NJ: Prentice-Hall.
- Johnson, D., Johnson, R., & Johnson-Holubec, E. (1988). *Cooperation in the classroom* (revised). Edina, MN: Interaction Book Company.
- Johnson, D., Johnson, R., & Johnson-Holubec, E. (1984). *Circles of learning*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Kallick, B. (1991) Workshop presentation, Babylon, NY School District.
- Lundsteen, S. W. (1979). *Listening*. Urbana, IL: National Council of Teachers of English.
- Marzano, R. J., Brandt, R. S., Hughes, C. S., Jones, B. F., Presseisen, B. S., Rankin, S. C., & Sapor, C. (1988). *Dimensions of thinking: A framework for curriculum and instruction*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Palincsar, A. S., & Brown, A. L. (1984). Reciprocal teaching of comprehension-monitoring activities. *Cognition and Instruction*, 1(1), 117-175.
- Paris, S. G., & Jacobs, J. E. (1984). The benefits of informed instruction for children's reading awareness and comprehension skills. *Child Development*, 55, 2083-2093.
- Piaget, J. (1971). *Biology and knowledge*. Chicago: University of Chicago Press.
- Rainer, T. (1978). *The new diary*. Los Angeles: J. P. Tarcher.

- Resnick, L. B. (1987). *Education and learning to think*. Washington, DC: National Academy Press.
- Resnick, L. B. (1976). *The nature of intelligence*. Hillsdale, NJ: Lawrence Erlbaum.
- Rowe, M. B. (1987, Spring). Wait time: Slowing down may be a way of speeding up. *Educator*, 11(1), 38-43.
- Schoenfeld, A. (1985). *Mathematical problem solving*. San Diego, CA: Academic Press.
- Schoenfeld, A. (1979). Explicit heuristic training as a variable in problem-solving performance. *Journal for Research in Mathematics Education*, 10(3), 173-187.
- Venezky, R. L., Wagner, D. A., & Ciliberti, B. S. (1990). *Toward defining literacy*. Newark, DE: International Reading Association.
- Wales, C., & Stager, A. (1977). *Guided design*. Morgantown, WV: West Virginia University, Center for Guided Design.
- Weinert, F. E. (1987). Introduction and overview: Metacognition and motivation as determinants of effective learning and understanding. In F. E. Weinert & R. H. Kluwe (Eds.), *Metacognition, motivation and understanding* (pp. 1-14). Hillsdale, NJ: Lawrence Erlbaum.
- Whimbey, A., & Lochhead, J. (1986). *Problem solving and comprehension*. Hillsdale, NJ: Lawrence Erlbaum.
- Wolvin, A. D. (1983, June). Improving listening skills. In R. B. Rubin (Ed.), *Improving speaking and listening skills: New directions for college learning assistance* (no. 12). San Francisco: Jossey-Bass.

"LIKE AN INCREDIBLY HARD ALGEBRA PROBLEM": TEACHING FOR METACOGNITION

John Barell

A tenth grade math student, Mark, was asked to reflect on the strategies he had used to solve algebra problems. He recalled speaking with a friend of his on the phone that day. She was very upset and said that "everything was bothering her!" Here is how he proceeded:

I got her to break down her problems into smaller ones, so that the sum of problems that she had would not seem so overwhelming—like an incredibly hard algebra problem, where you take it one step at a time rather than all at once, which makes you depressed when you can't solve it.

Mark then continued to discuss each problem separately with his friend, reviewing different ways to solve each. He wrote, "After we discussed each problem separately, we started to discuss her problems as a whole—like math again, where at the end you tackle the entire problem." Finally, Mark reflected on the whole process of helping a friend with her personal problems: "I got her to use a little metacognition, which I think is understanding and recognizing one's problems. She realized that she needed to be a little more positive about herself, and much more confident" (Barell, 1991, p. 148).

For me, this is a significant passage for a number of reasons. What do you make of Mark's writing? Take a minute to ponder its significance.

Well, perhaps you see here that Mark is, first of all, quite articulate about his thinking processes. He knows what he did to help his friend. He didn't write: "I helped her solve her problem. Period." Through extensive classroom practice, Mark has become aware of his thought processes and is able to use significant concepts to talk about them. Notice, for example, that he speaks of recognizing one's problem, then of breaking it down into smaller ones. Finally, he mentions the use of "metacognition" and defines it as "understanding and recognizing one's problems." We might disagree with his definition, but at least he is demonstrating an awareness and control of his own thought processes (for a discussion of the importance of awareness and control, see Swartz & Perkins, 1989).

Perhaps you also noted that Mark is very sensitive to his friend's self-perception: she needs a little more self-confidence. This observation reflects the importance of certain dispositions or habits of mind: our belief in our own abilities to solve the problems we encounter. Without that belief and a

THINKING JOURNAL

NAME _____

CLASS/GRADE _____

CONTENTS _____

1. Problems You Have Solved:

- a. What was the problem you had to solve?
- b. How did you solve it? (Identify thinking strategies, not solutions.)
- c. Did you solve it? Well? How did you feel working through it? Why?
- d. What would you do differently next time? Why? What did you learn about your problem-solving abilities? About Your feelings
- e. What other kinds of problems (in school and personal life) can you solve using these strategies? Where else are the strategies applicable? When could you have used these strategies in the past? When can you use them in the future?
- f. What are you learning about your thinking and feeling?

2. Problem Finding

- a. Identify a problem/dilemma/conflict of interest you have. It might be a situation outside of school if you wish.
- b. What questions do you have about this situation? Generate as many different kinds of questions about this situation as you can. Each week look over the list of questions posed last week and see how many more you can generate.
- c. How can strategies learned in class help you solve this problem, resolve the conflict or dilemma?
- d. How are your feelings and dispositions affected in this situation?
- e. What are you learning about responding to life situations as a result of recording your thinking in this journal?

From Barell, 1991, p. 225. Reprinted with permission.

Figure 1 Helping Students Achieve Metacognitive Awareness

good deal of persistence, chances are we won't solve a lot of life's difficulties. He is also open to her problem and has listened carefully in order to understand her situation.

Finally, I'm sure you have noticed, in this reflective piece of writing, that Mark has seen the relationship between what he does in algebra and what he did for his friend. He has made the connection between school and home, and between working with complex numerical problems and equally complex personal situations. In other words, Mark has transferred his knowledge from one domain to another through the process of writing and reflecting. The format he used was a Thinking Journal (see Figure 1) and in particular that portion labelled "Problems You Have Solved."

Mark's teacher, Rosemarie Liebmann, helped Mark transfer his knowledge of strategies from one area of life to another by using the Thinking Jour-

nal format, which challenges writers to think of how they solve problems in different domains (Question e. in Figure 1).

What we see in Mark's Journal entry is but one strategy enhancing the more thorough integration of knowledge and thinking amongst subject areas and between school and one's personal life.

THE ROLE OF METACOGNITIVE AWARENESS

What we see in Mark's journal entry is *metacognitive*. That is, Mark reflects on his own actions and analyzes them to identify his thought processes. More precisely, he identifies the thought strategies he used in order to help his friend solve her problem.

Swartz & Perkins (1989) define metacognition as becoming aware of your thought processes in order to then control them when appropriate. It is cer-

tainly appropriate to be able to use various strategies in attempting to learn a body of content. Palincsar (1991) notes that "metacognitive research suggests that students who are aware of the variables that influence learning and have the ability and will to take strategic control of their activity are generally successful learners." It is also appropriate, as in Mark's case, to apply strategies when confronted with a novel and personal problem.

Researchers and practitioners usually focus primarily on the cognitive when discussing metacognition, because that is part of the definition: "along with" or "beyond" one's cognitive operations. But it seems just as reasonable to discuss feelings, attitudes, and dispositions under the rubric of metacognition. Confronted with problematic situations that involve ideas *and* numbers, for example, some people immediately feel tension, deriving from poor prior experience with algebraic word problems. Unless we recognize such negative attitudes and overcome them, we will not be able to proceed with logical strategies, such as researching our background knowledge for concepts and strategies that might be helpful. Thus, *thinking* involves not only cognitive operations but the dispositions to engage in them when and where appropriate.

What is the relationship between metacognition and transfer? In order to transfer knowledge or skills from one situation to another, we must be aware of them; metacognitive strategies are designed to help us become more aware. Metacognitive strategies help us analyze and "mindfully" (Langer, 1989) abstract those strategies from the experience which we have successfully used before.

RATIONALE

Why teach for transfer? Doesn't it follow that, if we teach something well, students will more or less automatically find other places to use it constructively? Evidently not. You probably have as many stories about students' difficulties with transfer as anyone else. For example, students in science are often unable or unwilling to use their math skills. They may have difficulty using problem-solving processes learned in social studies while working

on problems at home. They may also have difficulty transferring concepts in the same subject from one unit to another. Why is this so? Perkins and Salomon (1989, and this volume) indicate that transfer does not happen automatically. Transfer is not like Little Bo Peep and her sheep, because the sheep in the transfer situation do not come home wagging their tails behind them. What is required is a very mindful "shepherding" of content from one situation to another (Perkins, 1992). Teaching for transfer, therefore, is something we need to be most mindful of in our everyday practice.

Even before most recent examinations of the transfer problem, curriculum development theorists like Tyler (1949) noted that good curriculum development has as one of its organizing principles a concept known as "Integration," according to which concepts, skills, and attitudes are transferred laterally to other subjects and dimensions of schooling. "Integration" accompanies "Continuity" (upward spiraling) of concepts within the K-12 curriculum and "Sequence" (where we encounter knowledge at greater depth and scope.)

METACOGNITION AND TRANSFER

As I indicated above, a Thinking Journal is one way of helping students become more aware of their thought processes and work toward increased ability to transfer knowledge, skills, and dispositions between different domains.

There is a range of strategies we should consider:

- Modeling Our Own Thought Processes
- Thinking Journals
- Generating Our Own Rules
- Reflective Questioning
- Students Posing Their Own Questions
- Students' Self-Assessments
- Setting Goals for Self-Development
- Studying the Thought Processes of Others
- Problem-Based Learning

The remainder of this paper will be devoted to a discussion of each of these strategies.

MODELING THOUGHT PROCESSES

Whether I work with college students or with third and fourth graders, one of the strategies I invariably rely on is modeling. This means I attempt to represent some kind of process by means of words, actions, and affect. Usually I model thought processes I have recently witnessed or experienced, to invite students first to observe the situation and then (if they are older) to attempt to analyze how the thinking in that situation proceeds.

For example, my wife and I not too long ago moved to a larger apartment, from the ninth to the tenth floor of our apartment building in New York City. For the occasion, we purchased a larger couch, one 92 inches in length. We measured the widths of the doors and the elevators to ensure that we could get it in. When it was delivered, much to our chagrin the delivery men were unable to fit it into the elevator, because it was too *long*! We tried two different elevators—service and passenger—and then the delivery men came to the reluctant conclusion that they would have to carry it up. They got to the third floor and stopped, because the walls narrowed and the ceiling lowered! We sat down to figure out another possibility but, unfortunately, could not. They left and then the regular movers arrived. When I told them of our dilemma, they responded, "Oh, that's an easy problem to solve!" What were they talking about, I asked myself. "You have to think of an elevator as not only a place in which to place things, but also as a place on which to place objects," they explained. They meant that the problem could be solved by placing the couch on top of the elevator cabin and riding up that way.

When we discuss this problem, we talk about identifying the problem, searching for options, weighing consequences, being persistent and flexible in one's thinking. Modeling helps us learn new strategies or ways of thinking, so we can ultimately use them whenever and wherever we wish to.

THINKING JOURNALS

Many students now use Thinking Journals to reflect on the ways in which they think and feel while working through difficult dilemmas.

Even if we are not consciously asking questions such as, "How can you use such ideas and skills elsewhere?" we are engaging students in the mindful abstraction of their learning processes. The abstracting process is fostered, for example, by a sixth grade teacher, Regina Kamlet, asking her students in science the following kinds of questions: "What did you learn about reasoning in science?" "What did you learn about how we prove things in science?" and "What did you learn about your own thinking?"

One student responded to the first question in this fashion: "I learned that first you have to make a plan. Next you have to ask yourself questions. After you do that the whole thing makes sense." It seems obvious to me that this student, through his reflections and mindful abstraction of the essential characteristics of his scientific inquiry, is going to be able to make better use of his new knowledge than someone who does not reflect on his experience in a fashion similar to this.

In high school math, again in one of Rosemarie Liebmann's classes, Shannon reflected in Part I of her Journal (Fig. 1) on the importance of problem identification, a process we know from research to be essential to good problem solving:

I don't think you can get anywhere in a problem if you don't identify it! After doing that and organizing all the facts one should ask questions which would maybe lead to possible solutions. After thinking up solutions, one should apply them to the problem. Imagine the result or outcome and evaluate which path or 'equation' is the easiest to take. (Barell, 1991, p. 228)

Here, Shannon has abstracted much more than problem identification. She has developed her own heuristic, which, interestingly enough, includes imagining the solution. This could mean picturing it in your mind—making a mental snapshot of what it would look like before you get there. Again, the student reflects on and then abstracts the essential characteristics of her thought processes, *which can subsequently be transferred into other domains, because there is a general process to follow.*

Transfer into other subjects is one of our major goals. In the following journal entry, Shannon at-

tempts to use the notion of strategies to solve problems of understanding *Romeo and Juliet*:

1. Take 'foreign' words and translate them (thy, thou, thee)
2. Read synopsis of the plot
3. Read questions and try to answer them completely
4. After every scene discuss the major points with a friend
5. Reread sections I don't understand and if I still have problems—Get help!
6. Get movie version for visual help. (Barell, 1991, p. 230)

Even though, in her list, Shannon has not abstracted a set of procedural or strategic characteristics—e.g., search out resources, find alternative ways of learning—she has the helpful notion of breaking her task up into small, more manageable parts.

Finally, a student like Marisol used her Journal to think about general ways of solving problems in her personal life:

Often, when I come across a difficult decision that I have to make I break down my problem so as to comprehend what my choices are and what results will come about from my decision. In today's teen world where peer pressure is becoming increasingly difficult, I often resort to my journal of thinking skills in making decisions on drinking and smoking.

In their writing, students have been assisted in one of the more important aspects of the process of transferring: abstracting the essential meanings and characteristics of operations, so that they can be generalized to other kinds of situations.

GENERATING OUR OWN RULES

The process of generating rules that can be applied broadly is similar to writing and abstracting general characteristics of how we handle problematic situations.

Mary Mulcahy is a first and second grade teacher, who engaged her students in a series of

problem identification and resolution activities. They explored problems such as deflated kick balls, broken arms and graffiti, and devised strategies for dealing with them. After engaging in a number of these discussions, Mary asked, "How would you teach a younger person to solve a problem?" This is a metacognitive question, which challenges us to engage in abstraction, with the potential for transfer and future use. Here are just a few of the twenty-three "rules" Mary's students generated:

- Think!
- Take the parts out of the problem that you don't really need—get to the main problem.
- Make the problem littler and littler
- Make sure you know what you are trying to figure out before you start to do anything.
- Work it out on a piece of paper—write it down in order, then list the best and worst solutions. This gets it better into your mind." (Barell, 1991, p. 155)

As you can see, Mary's first and second graders have focused on a process similar to Shannon's: problem identification. How many of us jump right into generating options and solutions without really understanding what the problem is all about? Mary's students have confirmed much of the research (Hayes, 1981) on the necessity to deliberate first before impulsively leaping at solutions.

REFLECTIVE QUESTIONING

Perhaps the easiest strategy to enhance metacognition and transfer at the same time is to pose questions such as: "How did you figure that out?" or "Where else have you used or can you use such a strategy?" The first question is designed to focus on the problem-solving processes, not on the answers. One second grade teacher, Carole, asked a below average math student to figure out this problem:

"What is one quarter of 76?"

David thought for a few seconds and then responded, "If you will tell me what one half is I think I can solve it."

Carole said, "One half of 76 is 38."

David pondered a bit more and said, "One quarter of 76 is 19."

Carole then asked, "How did you solve it?"

He responded, "In my memory bank, I knew that one half of 30 is 15 and half of 8 is four. Then $15 + 4 = 19$."

Here David accurately described his strategies. Whether or not he could transfer them to another problem, we don't know for sure. But we guess he is aware that he broke this problem down into manageable parts, and that it would work elsewhere.

It goes without saying that David has transferred, to this problem, skills that he has used successfully before. Teaching for transfer is not simply a matter of encouraging a student to transfer out of one situation, but one of enhancing our ability to draw on all of our vast mental, emotional and physical resources to help us figure out how to resolve complex situations.

The questions "How did you solve it?" and "What made you ask that?" often help students probe the ways in which they think, and they serve to initiate the metacognitive and transfer processes.

Another reflective question is "What relationships or connections can you see between this concept or idea and anything else you know about?" Here we are working toward what Perkins & Salomon (this volume) call the "connected curriculum." Challenge students to make conclusions between what is in front of them and what they have stored in long term memory. Such connections can be elaborated in Thinking Journals. They can be useful in creating metaphors (seeing the brain as a computer), in designing visual thinking webs ("mind maps"), and in working through problem-based curricular units. (See below).

STUDENTS POSING THEIR OWN QUESTIONS

Students should be generating their own questions. Too much of schooling involves teachers asking students to answer a question. Research by Dillon (1988) notes that "children ask fewer questions in school than out of it, and fewer and fewer as they

progress through school." Why is this important? Because students who pose their own questions can figure out how to answer them and then reflect on their strategies, thus acquiring more awareness and control of the problem-solving processes.

At the third grade level, students have finished questions as part of an inquiry program examining novels, using Ogle's (1986) K-W-L strategy; video tapes of animals, such as boa constrictors and Emperor penguins; and science texts using photos of a half illuminated earth, taken from the Apollo spacecraft with the surface of the moon in the foreground. They generated lots of questions, figured out how to answer them and then reflected on the process. Three of their more interesting questions were: "Why are school buses yellow?" "Does living long have to do with the mind?" and "What if the sun exploded?"

After figuring out how to answer these questions (by calling local transportation experts, looking up information in the encyclopedia and asking other adults), these third graders reflected on their inquiry processes.

When asked, "What did you learn about yourself?" one student answered, "That I was smart...That I like finding answers the best. Thinking up questions was hard!" It was very evident that these students had very positive feelings about getting answers and some difficulties at working with their friends.

Then we asked the "transfer question": "How would you go about teaching a first grader to answer a difficult question?" Sarah said, "First tell him to find and answer smaller questions and work up to the bigger question." Here Sarah is using a strategy (not taught directly) similar to Mark's and the first graders mentioned above: break the complex situation or problem down into manageable parts.

Similarly, at the level of Advanced Placement, biology students have used their Thinking Journals to reflect on their readings in the text book and on their experiments. Another student, also Mark, wrote the following observations and questions:

We are making molecules with different bonds. I have just made a molecule—butane—that has free bond rotation, which means the molecule's carbons

can turn on its bond. Even though they have the capability of doing so, why would they? Also what makes them move? Kinetic energy? I wonder what the world would be like if there was no free bond rotation?—REALLY cold, I gather, with no motion at all.

From these kinds of musings and "what if" questions, science proceeds toward understanding. And David can proceed toward a more in-depth understanding of how science works. This might be a different level of metacognitive awareness: how we proceed from observations through reflections on causal reasoning to speculation in specific subject areas.

The research of Palincsar and Brown (1984), cited by Perkins and Salomon (this volume), suggests that self-questioning (or the "self-guidance ability") might be particularly helpful for what they call "far transfer" to other domains.

STUDENTS' SELF-ASSESSMENTS

If we wish students to be more directly in control of their own learning, we will have to alter our evaluation paradigm, in which the teacher analyzes and evaluates. Students can perform this operation themselves and most often do. Just asking, "What have you learned from our study of *Charlotte's Web*?" will provoke certain responses related to the content of the novel. But if we also ask "What have you learned about yourself, your thinking, about working with others?" then we can help students abstract more meaning from their studies, which can be transferred into other contexts.

One fourth grader analyzed her performance during an inquiry experience: "Thinking of questions is really hard. But I learned that it's easy to answer questions if you really put your mind to it. It's easy to think of a question you really like." (Barell, 1992) Realizing the roles of interest and persistence can be very important in any endeavor. Self-assessment is a logical initial step in any problematic experience where we ask, "What do I know already? What do I need to know? How might I proceed?" Such assessments lead to setting a goal and designing a strategy for ourselves.

STUDENTS SETTING GOALS FOR SELF-DEVELOPMENT

One of the best ways to help anyone be more in control of her own learning, thinking and productive efforts is to foster setting a goal, designing strategies, implementing these strategies and reflecting on progress. Goal setting, like assessment, is one of those generalizable strategies transferable to any domain of life.

Students from fifth to twelfth grade were encouraged to engage in such processes. What we learn from their efforts is that many students are not familiar with the concept of "strategy." We must work with them, through class discussions, to help them understand what strategies are (plans to achieve a result). We can use their own experience (When you wanted to get a bicycle for your birthday, what did you do? When you wanted to get a better grade, what did you do?), or our subject matter. Columbus was a person who had a vision, set goals, designed strategies, implemented them and achieved certain results, not all of them positive.

One sixth grader noted when reflecting on the value of setting a goal:

I learned that you have to have strategies for your goals if you intend to accomplish them. You also have to concentrate on your goal so that you don't forget about it. Another step to reaching goals is to keep trying like Christopher Columbus. If he had given up, we would have never heard of him to this day.

Concentration and, again, persistence, are encouraged through this metacognitive strategy, which can be transferred into other contexts.

STUDYING THE THINKING OF OTHERS

We are daily confronted with the thinking of others, which can serve as instructive models. A politician claims that someone in high public office was "blindly fatalistic" in his 1988 assessment that the "Communist Party remains untouched and untouchable" (Bradley, 1991). What do we learn about the author's thinking, about his possible

biases in a confirmation hearing and about the objectivity of the person he is writing about?

We rely on models of inquiry in every subject area, but one of the best summaries of such models is *Notebooks of the Mind* by Vera John-Steiner (1985). Books like this show us how creative and productive people think and feel their way through their work. We may read, for example, how Einstein reflected on his own thought processes: "The physical entities which seem to serve as elements in thought are certain signs and more or less clear images which can be 'voluntarily' reproduced or combined" (p. 85). We could also explore how Aaron Copland composed music, often playing one introductory measure over and over again: "...each time you repeat it, you have a different idea of where it might go. It is the process of saying, how will this first idea inspire me toward the next one" (p. 157).

These statements and reflections can help us focus on our own ways of drawing conclusions and producing work. We can, in other words, transfer from one person's thought processes to our own where appropriate.

PROBLEM-BASED LEARNING

Beyond the aforementioned specific strategies, which can be used at any particular moment, there are longer range curricular approaches to enhancing students' awareness and control of their own thought and feeling processes.

One such approach is to find or "disclose" within the curriculum opportunities for students to engage in problem solving. When students are posing and resolving problematic situations we have excellent opportunities to take ideas, concepts and skills from one context and bring them to bear on another. Problem-based learning affords us excellent opportunities to transfer concepts to our specific subject area as well as transfer ideas and skills out toward other school and personal domains. Here is an excellent opportunity to use the Planning, Monitoring and Evaluating strategy. When we Plan, we identify the problem and lay out strategies. When we Monitor we ask ourselves, "How well am I doing?" and when we Evaluate we ask, "How well did I do?" Such an overall strategy is useful here as

with other specific strategies, such as setting personal goals.

We usually think of mathematics and science as problem oriented. Textbooks are laid out with problems within or at the end of each chapter. But we can consider the humanities as problem oriented as well. Every story or novel is based upon a protagonist confronted with problematic situations for him or her to solve. For example, Macbeth had to confront a problem after he encountered the three weird sisters. Similarly, history is the record of how human beings have solved the most significant kinds of problems over the years. For example, the Civil War recorded in our textbooks is the story of how men such as Lincoln, Lee, Grant and Davis posed and resolved dilemmas for themselves and for the country.

A problem-based approach affords students the opportunity of re-thinking how Columbus solved the problem of a potential mutiny just before sighting San Salvadore, for example (Morison, 1942); or of figuring out how you would respond to a young child's killing a cat out of spite if you were Richard Wright's mother in *Black Boy*.

Research (Bransford et al., 1986) suggests that, if we acquire information within a problem-based mode, it will more easily be available for transfer when we want it. This makes sense, because within such a context we are using information constructively—generating and analyzing options, making decisions, reflecting—not merely taking it in and then passing it back verbatim. This research is also in accord with that by Mayer (1975, 1989) demonstrating that when we seek relationships between newer and already stored information, when we build models and create metaphors we are empowering ourselves to retain information for longer periods of time and "enabl[ing]" transfer to occur. It is within such problem-oriented contexts that we bring to bear our full range of prior knowledge, our knowledge of specific strategies, our interest in pursuing questions of importance to us, all in ways that may facilitate learning and thinking for transfer in its most concentrated form.

Within such a problem-based structure we can help students, through questioning, reflecting in journals and/or developing rules for figuring

things out individually and cooperatively, to transfer significant curriculum "stuff" from the focus subject into any domain they choose, whether at school or in their personal lives. The potential for multi-faceted transfer is very strong with the problem-oriented curricular options.

CONCLUSION

Perkins and Salomon (this volume) speak of transfer strategies as helping us to "bridge" from one situation to another. They also help us move from the known to the unknown, just as a metaphor like "Life's but a walking shadow" helps us use one concept (shadow) to understand Macbeth's life as his kingdom begins to collapse around him.

The strategies mentioned above are just a few of the possible bridges we can help students create, thereby extending their power and control over more life situations than those mentioned in the classroom. This is, after all, the ultimate goal: to

help students (and ourselves) learn how to take more control of their lives, academic as well as personal.

Donna is a young teacher who, after repeated practice in asking varieties of questions to invite the thoughtfulness of her colleagues, wrote the following in her Journal:

I find myself asking probing questions during normal conversation with family and friends. I mean, whereas before I would simply accept what I was told, now I find myself asking, 'Well, how do you know that?' Or I'll ask them (in a subtle way, of course) to relate some experience or produce some evidence. I can't help it. I feel compelled! (Sparacio, 1989)

This, I submit, represents one kind of mindful shepherding of students' understanding from one subject area into, not only other subjects, but the personal dimensions of their lives.

REFERENCES

- Barell, J. (1992). "...EVER WONDER..." Teacher Idea Book. Columbus, OH: Zaner-Bloser.
- Barell, J. (1991). *Teaching for thoughtfulness: Classroom strategies to enhance intellectual development*. White Plains, NY: Longman.
- Bradley, W. (1991, September 16). Now questions about Iraq. [Editorial], *The New York Times*, p. A 19.
- Bransford, J., Franks, J., Vye, N., & Sherwood, R. (1986). New approaches to instruction: Because wisdom can't be taught. Paper presented at a conference on Similarity and Analogy, University of Illinois, Chicago.
- Dillon, J. (1988). The remedial status of student questioning. *Journal of Curriculum Studies*, 20, 107-210.
- Hayes, J. (1981). *The complete problem solver*. Philadelphia, PA: Franklin Institute Press.
- John-Steiner, V. (1985). *Notebooks of the mind*. New York: Harper & Row.
- Langer, E. (1989). *Mindfulness*. Reading, MA: Addison-Wesley.
- Mayer, R. (1989). Models for understanding. *Review of Educational Research*, 59(1), 43-65.
- Mayer, R. (1975). Information processing variables in learning to solve problems. *Review of Educational Research*, 45, 525-542.
- Morison, S.E. (1942). *Admiral of the ocean sea: A life of Christopher Columbus*. Boston: Little Brown.
- Ogle, D. (1986). K-W-L: A teaching model that develops active reading of expository text. *The Reading Teacher*, 39, 564-570.
- Palincsar, A. (1991). Evaluating instruction and students from a metacognitive perspective. *Cogitare*, 5(4), 1, 3.
- Perkins, D. (1992). *Schools of thought: The necessary shape of education*. New York: Basic Books.
- Perkins, D., & Salomon, G. (1989). Are cognitive skills context-bound? *Educational Researcher*, January-February, pp. 16-25.
- Perkins, D., & Salomon, G. (1988). Teaching for transfer. *Educational Leadership*, 46(1), 21-31.

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Sparacio, D. (1989). Final thinking journal summary. Unpublished manuscript, Montclair State College, Montclair, NJ.

Swartz, R., & Perkins, D. (1989). *Teaching thinking: Issues and approaches*. Pacific Grove, CA: Midwest Publications.

Tyler, R. (1949). *Basic principles of curriculum and instruction*. Chicago: University of Chicago Press.

IF MINDS TRULY MATTER: THE INTEGRATED CURRICULUM

Robin Fogarty

To the young mind every thing is individual, stands by itself. By and by, it finds how to join two things and see in them one nature; then three, then three thousand; and so, tyrannized over by its own unifying instinct, it goes on tying things together, diminishing anomalies, discovering roots running underground whereby contrary and remote things cohere and flower out from one stem... The astronomer discovers that geometry, a pure abstraction of the human mind, is the measure of planetary motion. The chemist finds proportions and intelligible method throughout matter; and science is nothing but the finding of analogy, identity, in the most remote parts.

—Ralph Waldo Emerson

To help the “young mind...[discover] roots running underground whereby contrary and remote things cohere and flower out from one stem” is at once the mission of the teacher and of the learner. This chapter presents ten models to connect and integrate the curricula.

THREE DIMENSIONS TO INTEGRATED CURRICULUM

A common vision encompassing three distinct dimensions of integrated curriculum is represented in Figure 1. The vertical spiral represents the “spiraling” curricula built into most text materials as content is integrated and revisited through the K-12 grades. Mastery of certain material is expected at each level in preparation for the next levels. Integration occurs vertically throughout the schooling years.

The horizontal band represents the breadth and depth of learning in a given subject. As different subjects are approached, explored, and learned within each discipline, a cumulative effect is anticipated. Learners expand their conceptual bases for future study in related fields: one math concept builds toward the next as ideas are integrated within a discipline.

Finally, the circle represents the integration of skills, themes, concepts, and topics across disciplines as similarities are noted. These explicit

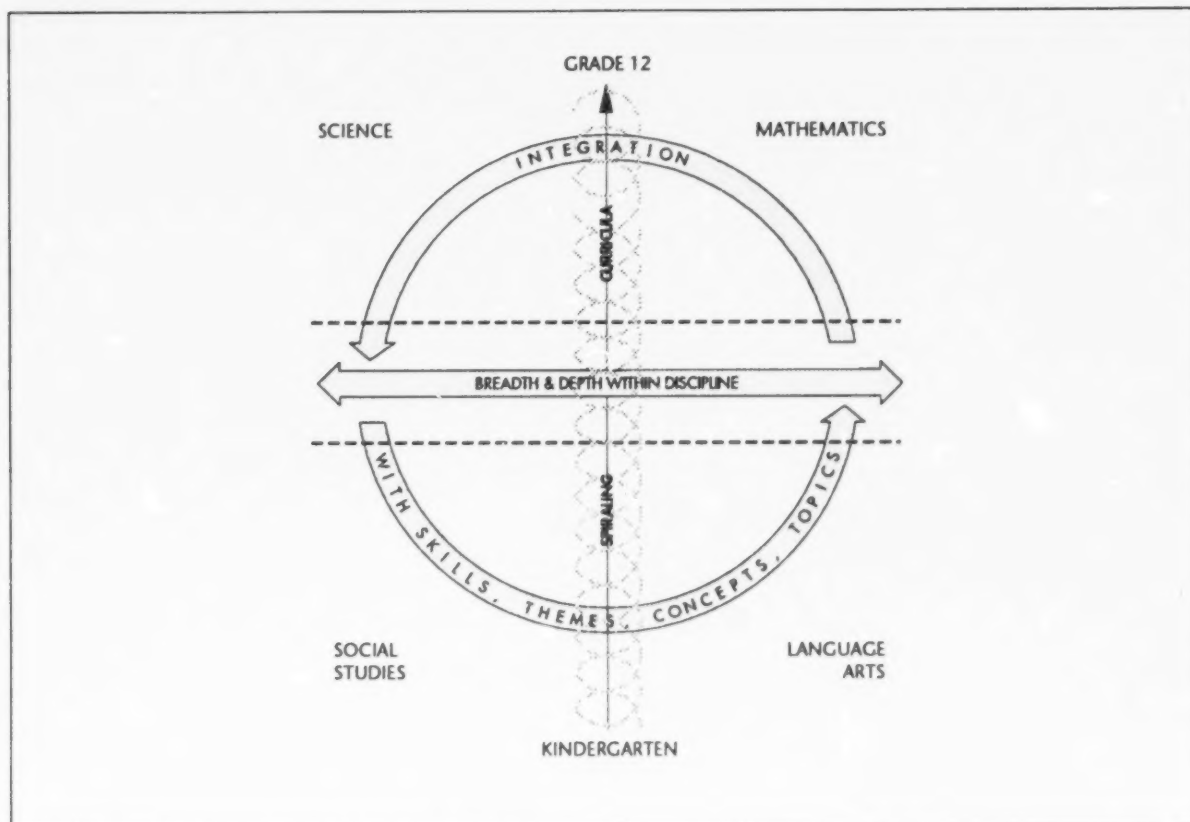


Figure 1 The Three Dimensions of the Integrated Curriculum

connections are used to enhance the learning in a holistic manner as students link ideas from one subject to ideas in another subject.

Yet, despite this common vision of an integrated curriculum, ambiguity surrounds the term. Just what does "integrating the curricula" mean? Does it mean sifting out the parcels of each overloaded discipline and focusing on the priorities in depth? Does it mean integrating or connecting yesterday's lesson to today's topic? Or relating all issues studied in the science class to the concept of evolution in biology? Does it mean targeting multi-dimensional skills and concepts within one lesson? Or rearranging the sequence of topics taught, to ensure that parallel topics are taught at the same time?

Does the concept of integrated curriculum mean integrating one subject with another through shared concepts? Does it mean selecting

an overall theme such as "persistence" or "argument," or a topic as familiar as "transportation" and using a thematic umbrella across all disciplines? Does it mean integrating the content of what is taught with cognitive tools and cooperative strategies that cross disciplines and spill over into life situations?

Does integrating the curricula encompass interdisciplinary team planning in which conceptual overlaps become the common focus across departments? Or does it refer to integrative threads within the learner that connect past experiences and prior knowledge with new information and novel experiences?

The answer, of course, is that integrating the curricula can follow any of these models. Each teacher and each learner views the integration process differently. As depicted in Figure 2, both in-

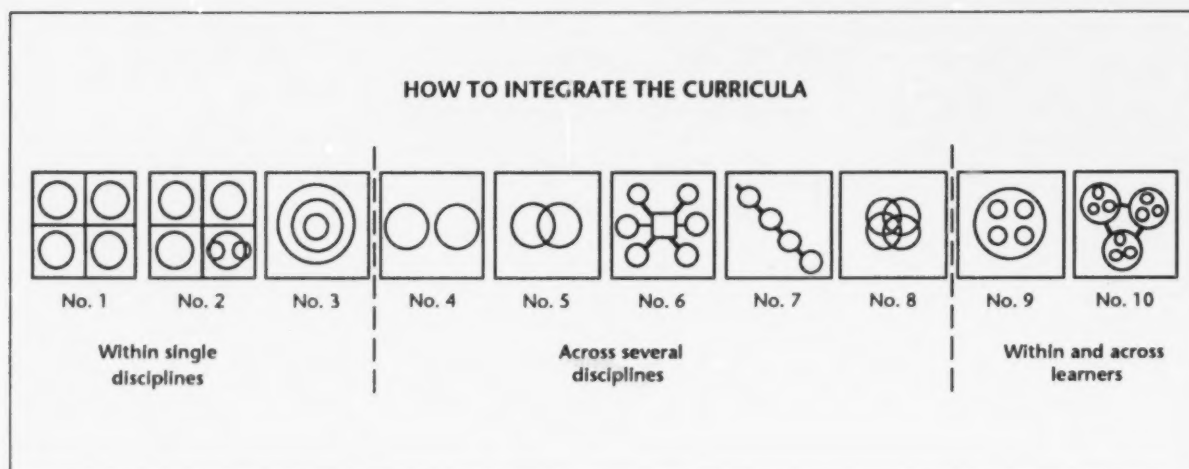


Figure 2 How to Integrate the Curricula

tegration within a discipline and integration across disciplines are viable models.

Beginning with an exploration within single disciplines, at the left end of the spectrum, and continuing with models that integrate across several disciplines, the continuum ends with models that integrate within the learner himself and finally across networks of other learners.

Detailed outlines of the models comprise the bulk of this chapter. The advantages and disadvantages of each model are noted and a completed sample illustrates how teachers may actually use the model to design integrated curricular content. In addition, notes and reflections provide further insights into each of the models. A one-page brief overview is then represented in Figure 14 where models one through ten are illustrated for an "at-a-glance" synopsis.

MODEL ONE FRAGMENTED: Viewed Through a Periscope

Education is the instruction of the intellect in the laws of nature.—Thomas Huxley

The traditional model of separate and distinct disciplines, which fragments the subject areas, is the view of curricula through a periscope. This view

offers one sighting at a time; one that focuses on a single discipline. Typically, the four major academic areas are labeled Math, Science, Language Arts, and Social Studies.

A young high school student compared the fragmented curriculum to a vaccination: "Math is not Science, Science is not English, English is not History. A subject is something you take once and need never take again. It's like getting a vaccination; I've had my shot of algebra. I'm done with that."

One of the advantages of this fragmented model is that the purity of each discipline is left untainted. In addition, instructors prepare as experts in a field and have the luxury of digging into their subjects with both breadth and depth. This traditional model also provides a comfort zone for all concerned, because it represents the norm. We're used to it. The weight of these pluses must not be taken too lightly. There is value in examining one discipline or subject as a separate and distinct entity in order to reveal the critical attributes of each discrete field. This model, although fragmented, does provide clear and focused views of the disciplines. Experts can easily sift out the priorities of their own subject areas. In addition, students can often realize the benefits of working with a true mentor in this model.

The disadvantages are twofold. The learner is left to his own resources to make connections or

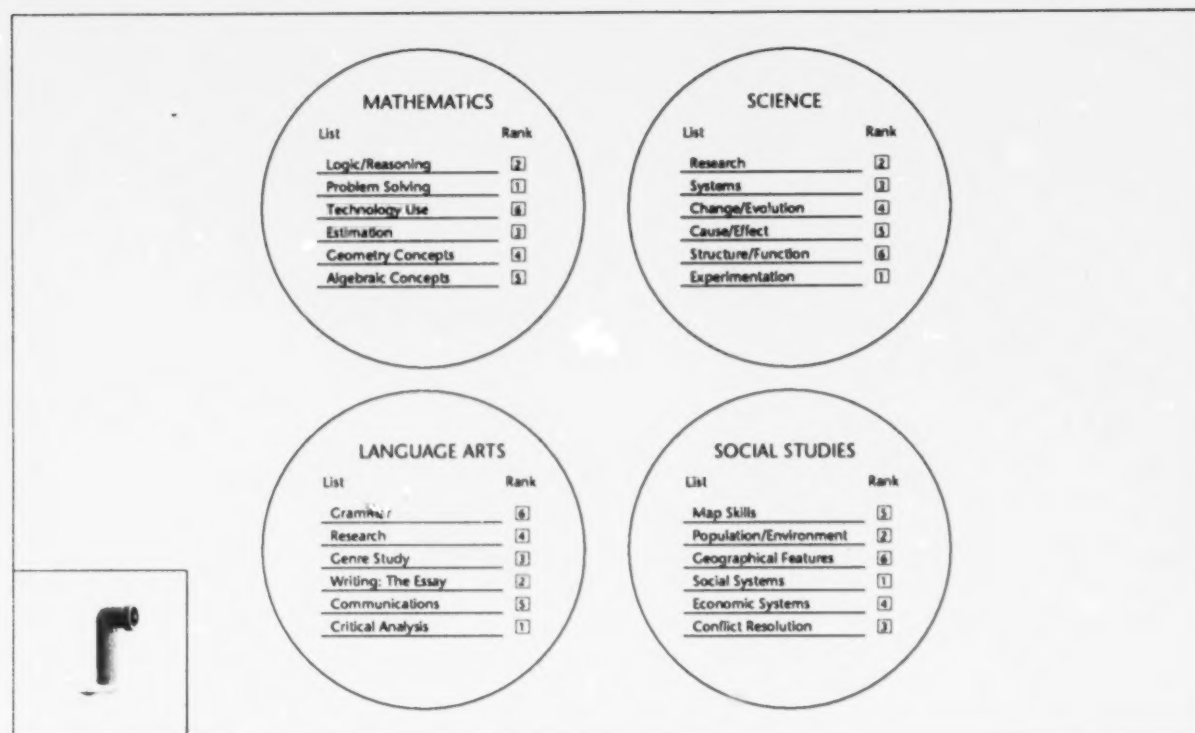


Figure 3 The Fragmented Model: Curriculum Viewed Through a Periscope

integrate similar concepts, as connections between two different disciplines are seldom made explicit. In addition, since overlapping concepts, skills, and attitudes are not illuminated for the learner, transfer to novel situations is not as likely to occur. Disciplines are arbitrary. There are no real separations, only categories devised by Descartes over three hundred years ago. Today, there is no such thing as a "biologist"—rather there are hydro-microbiogeochemists!

The organizational structure of a fragmented curriculum in a discipline, subject, or course is a matter of listing priority units or topics, then ranking them according to importance to overall curricular requirements, as shown in Figure 3.

Notes & Reflections

Within each discipline teachers list topics and content for their particular disciplines. For example, the Language Arts teacher lists the typical topics for a semester. The sequence and time allotment is determined by individual teachers, using their own

criteria. They then sift out curricular priorities by "selectively abandoning" or "judiciously including" material in curricular designs (Costa, 1988).

This is a useful curricular configuration for large schools with diverse populations. The variety of course offerings provide a spectrum of subjects targeting special interests. It is most useful at the university level where students travel on specialized paths of study that require expert knowledge for instruction, mentoring, coaching, and collaboration.

MODEL TWO

CONNECTED: Viewed Through an Opera Glass

The object of education is to prepare the young to educate themselves throughout their lives.

—Robert Maynard Hutchins

The connected model of the integrated curriculum is the view through the opera glass that provides a close-up of the details, subtleties, and intercon-

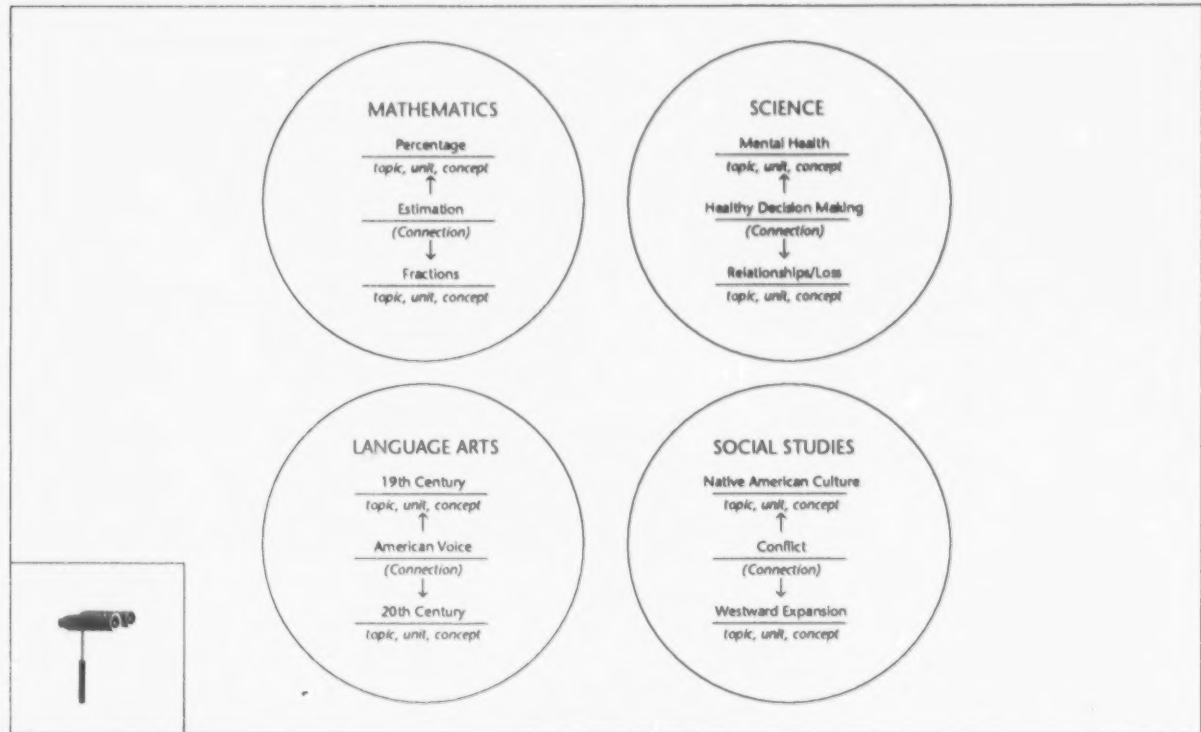


Figure 4 The Connected Model: Curriculum Viewed Through an Opera Glass

nectedness within one discipline. Within each subject area, course content is connected topic to topic, concept to concept, and related explicitly.

For example, in a junior high or secondary school setting, the Earth Science teacher relates the Geology unit to the Astronomy unit by associating the evolutionary nature of each. The similarities between the two become organizers for students as they work through both units to see how they can establish explicit interrelationships.

By connecting ideas within a discipline, the learner has the advantage of seeing the big picture as well as doing a focused study of one aspect. In addition, key concepts are developed over time for internalization by the learner. Connecting ideas within a discipline permits the learner to review, reconceptualize, edit, and assimilate ideas gradually to facilitate transfer.

The various disciplines in this model remain separated and appear unrelated even though connections are made explicit within the designated discipline. Teachers may or may not work together

in this model. Content tends to remain the focus without stretching concepts and ideas across to other disciplines. The concentrated efforts to integrate within the discipline may overlook opportunities to develop more global relationships to other subjects.

The organizational structure of a connected curriculum for a single discipline is a matter of thinking of units, topics, or concepts within a discipline which have just been, or will soon be, taught, and jotting down a "connection." This central "connector" may be a skill, concept, attitude, or even topic that captures similarities. (See Figure 4.)

Notes & Reflections

Each discipline connects particular topics, units, or concepts with similar organizers. These frameworks provide common focal points for integrating ideas.

The connected model is useful as a beginning step toward an integrated curriculum. Teachers feel confident looking for connections within their

own discipline. As they become adept at relating ideas within the discipline, it becomes easier to scout for connections across disciplines. Also, connection making can be done collaboratively within department or grade level meetings—which is, again, old and familiar ground that creates a safe climate for change. Starting teacher teams with this model within the department or grade level can be a fruitful strategy to prime the pump for more complex integration models later on.

MODEL THREE

NESTED: Viewed Through 3-D Glasses

The business of education is not to make the young perfect in any one of the sciences, but to open and dispose their minds as may best make them capable of any, when they shall apply themselves to it.

—John Locke

The nested model is a three-dimensional view of integrated curricula, in which multiple dimensions of a lesson are targeted. For example, a social skill, a thinking skill, and a content-specific skill can all be the focus of a lesson. This nested model, as observed by students, is described like this:

STUDENT #1: Teachers used to be pretty predictable. They would tell you what you were supposed to know and then test you on it.

STUDENT #2: Yeah! I know what you mean. It was easy to psych out the test questions because the stuff was repeated eighteen times in class.

STUDENT #1: But now, they expect you to sort out what's important. And they want you tell them how you figure things out.

STUDENT #2: That's not all. My teacher watches our "social behavior," too. She says our thinking and our behavior are just as important as our answers. This is getting out of control.

STUDENT #1: Yeah! They're getting too much mileage out of one lousy lesson.

As noted in the vignette, the student senses the added learner responsibility that accompanies the

nested goals. Just as in typical work settings, it is the wholeness of the task that matters, not single skills done in isolation.

By nesting and clustering multiple objectives in the learning experience, student learning is enriched and enhanced. In this day and age of information overload, over-crowded curricula, and tight schedules, the experienced teacher may seek out fertile lessons that lay the groundwork for learning in multiple areas.

However, while the nested model provides the needed attention to several areas of interest at once, it does not require the added burden of finding time to work and plan with another teacher. With this model, a single teacher can provide extensive integration of curricula. Yet, collaboration yields its own rewards in terms of enhanced ideas developed through dialogue.

The possible disadvantages of the nested model arise from its very nature. Nesting two, three, or four learning targets into a single lesson may confuse students if the nesting is not executed carefully. The conceptual priorities of the lesson may become obscure, because students are directed to perform many learning tasks at once.

An advantage is the efficiency or economy of the model. While teachers have multiple objectives to "cover" in a school year, nested objectives allow teaching multiple goals simultaneously.

Planning a nested curriculum involves the selection of a content piece as the first target and the identification of two other instructional focal points to nest in a single lesson or unit of study. (See Figure 5.)

Notes & Reflections

Within a content area, the teacher uses the subject matter as the frame for a number of skills, concepts, and attitudes. The topic or unit acts as a vehicle to carry along the learning in related areas.

The nested model is most appropriate to use as teachers try to infuse thinking skills, cooperative skills, research skills, and organizational skills into their content lessons. Keeping the content objectives in place, while adding a thinking focus or targeting social skills, and weaving research and organizational skills into the lesson enhances the overall learning experience. Nesting particular

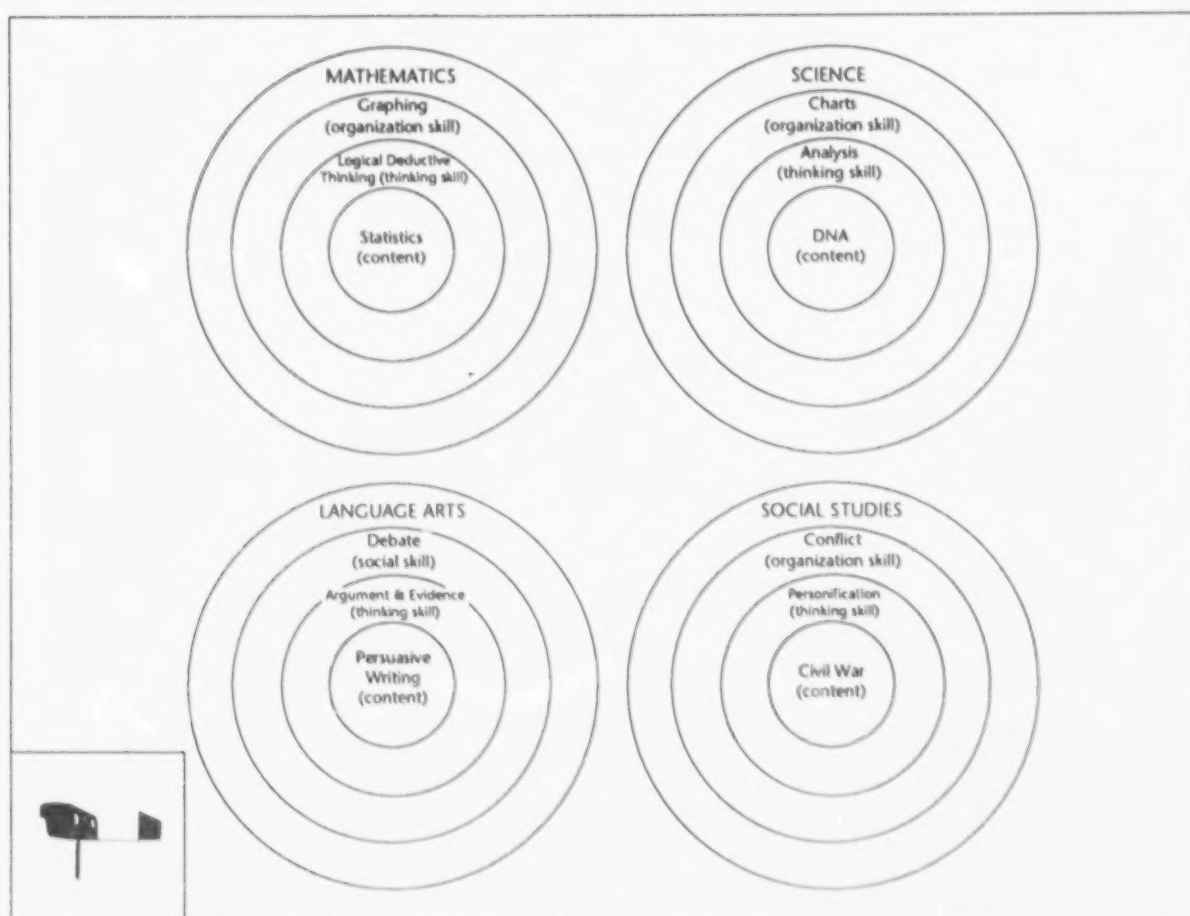


Figure 5 The Nested Model: Curriculum Viewed Through 3-D Glasses

skills in these three areas integrates concepts and attitudes easily through structured activities.

MODEL FOUR SEQUENCED: Viewed Through Eyeglasses

Education is the transmission of civilization.

—Will and Ariel Durant

The sequenced model of integration is viewed with eyeglasses. The lenses are separate but connected by a common frame. Topics or units of study, although taught separately, are rearranged and sequenced to provide a broad framework for related concepts.

In the self-contained classroom, *Charlotte's Web* can accompany the unit on spiders. *Johnny Tremain* can

parallel the study of the Revolutionary War. The graphing unit in Math can coincide with data collection in the weather unit in Science. A secondary situation might sequence the study of the stock market in Math with the study of the Depression in History. Both domestic and global events can be used to parallel various units in the various subjects. In this way, current and relevant topics become the catalysts to study historic foundations, related mathematical concepts, or appropriate literary references.

By rearranging the sequence of topics, chapters, and units, teachers can dictate the curricular priorities rather than following the sequence established by the editorial staff of the textbook. In this way, teachers can make the critical decisions about content. From the students' point of view, the deliberate sequencing of related topics across disci-

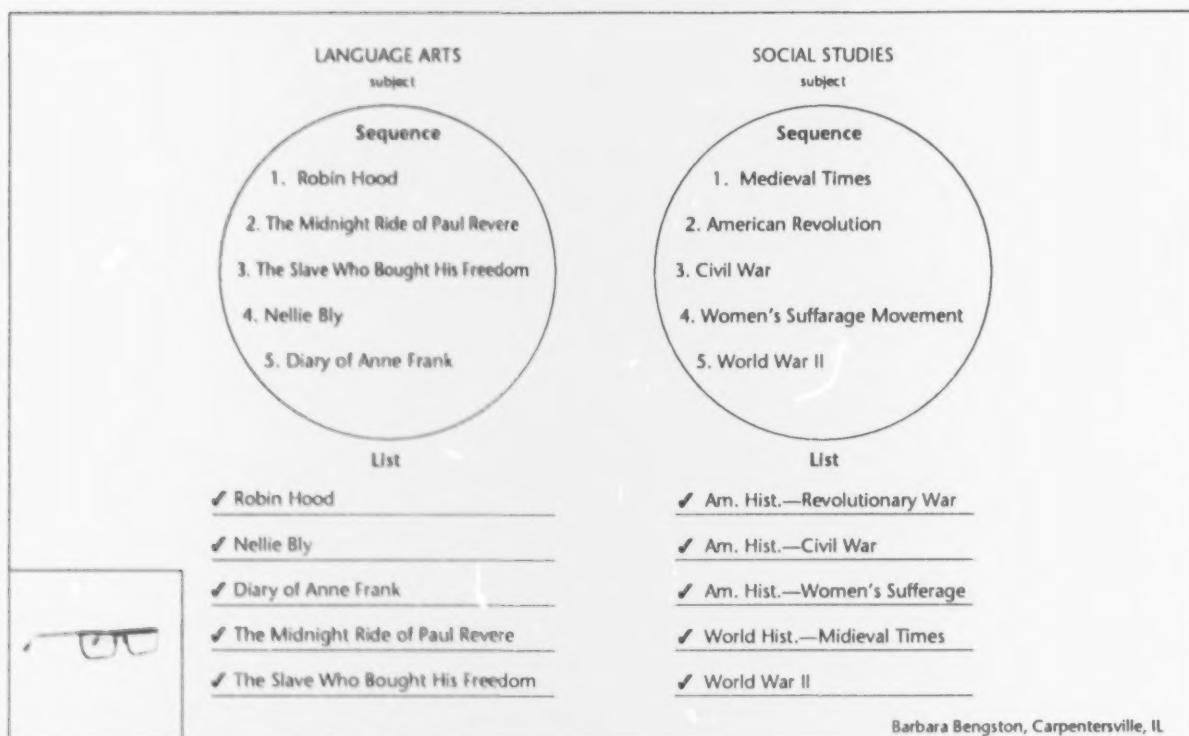


Figure 6 The Sequenced Model: Curriculum Viewed Through Eyeglasses

plines helps them make sense of their studies in both subject and content areas. Once again, integration aids transfer. When students see teachers in different content areas, in different rooms, in different periods, making similar points, their learning is reinforced in powerful and meaningful ways.

A drawback of sequenced curricula is the compromise required to shape the model. Teachers must give up autonomy in determining curriculum sequences as they partner with others. Also, to sequence according to current events requires ongoing collaboration and extreme flexibility on the part of all content-area teachers involved. This is not as easy as it sounds. However, in a very short time, even with only one afternoon together, teacher partners can easily do some rearranging and sequencing as a beginning step. If this first attempt at correlating two subject areas works, the two teachers or even a team of three or four teachers can try sequencing more units for parallel teaching. (See Figure 6.)

To structure a sequenced curriculum, teachers, in grade level partners or cross-departmental pairs, list topics, units, or content pieces from two different disciplines. Then they sequence them to parallel their teaching.

Notes & Reflections

Sequencing units in one content area with those in another subject is an easy way to ensure that students make connections.

The sequenced model is useful in the beginning stages of the integration process, using two discipline areas that are easily tied to each other. The teachers, working as partners, start by listing curricular content separately. Then, the team tries to juggle the separate content pieces until the two "match up," or sequence; or they find things that coincide. They try to parallel different content areas to make more sense to students who are learning both. In this model, both disciplines stay pure. Specific emphasis is still in the domain of the

subject matter, but the student reaps the benefit of explicitly related content.

MODEL FIVE

SHARED: Viewed Through Binoculars

The chief object of education is not to learn things, but to unlearn things.—G.K. Chesterton

The shared model of curricular integration brings two distinct disciplines together into a single focused image. Shared planning and teaching in two disciplines focuses on the overlapping concepts as organizing elements.

Cross-departmental or grade level partners plan a unit of study at the middle, secondary, or elementary school levels respectively. For example, two members of the team approach the preliminary planning session with a notion of key concepts, skills, and attitudes traditionally taught within the single-subject approach. As the pair identify their respective priorities, they look for overlaps in subject matter content. For example, the Literature teacher may focus on the concept of "the American Dream" as an organizer for a collection of short stories by American authors. At the same time, the History teacher notes that the unit on American History, which focuses on a study of each of the decades, could also use "the American Dream" as a unifying theme.

Advantages of this model of shared curriculum planning rest in the ease of using this as an early step toward more fully integrated models encompassing the four major disciplines. By coupling similar disciplines, the overlaps facilitate deep learning of concepts for transfer. Simply put, it's easier to schedule common planning periods for a two-teacher team than it is to juggle the scheduling for a four-teacher team. In addition, planning often leads to shared instructional experiences such as a film or field trip, because the two teachers can put their two periods together to create a larger time block.

A barrier to shared curricula is the planning time needed to develop the models. In addition to the time, flexibility and compromise are essential ingredients for successful implementation—it re-

quires both trust and teamwork. This model of integration across two disciplines requires commitment from the partners to work through the initial phases. To find real overlaps in curricular concepts requires in-depth dialogue and conversation.

Shared curricula are created through examining two disciplines that seem to have natural interrelationships, containing concepts, and ideas that overlap. Previously prioritized topics are compared for commonalities in extensive discussion. Generalizable skills, concepts, or attitudes are identified. Careful analysis and synthesis are necessary for fruitful innovations in this model. (See Figure 7.)

Notes & Reflections

Topics and units from two related disciplines offer rich possibilities for integration through the identification of basic concepts, skills, and attitudes that overlap.

The shared curricula model is appropriate when subject matters are clustered into broad bands such as the Humanities or Practical Arts. This model facilitates early stages of implementation toward integrated curricula. It is a viable model to use with two disciplines as an intermediary step to the four-discipline teams which are much more complex.

MODEL SIX

WEBBED: Viewed Through a Telescope

We must open the doors of opportunity. But we must also equip our people to walk through those doors.

—Lyndon B. Johnson

The webbed model is viewed through a telescope capturing an entire constellation of disciplines. A fertile theme is webbed to various curriculum contents. Themes are developed around concepts, topics, and categories. Typical lists look like those in Figure 8.

An advantage of the webbed approach to curricular integration is the motivational factor that results from selecting high-interest themes. In addition, the webbed model or unit-writing approach is familiar to seasoned teachers and is a fairly straight-

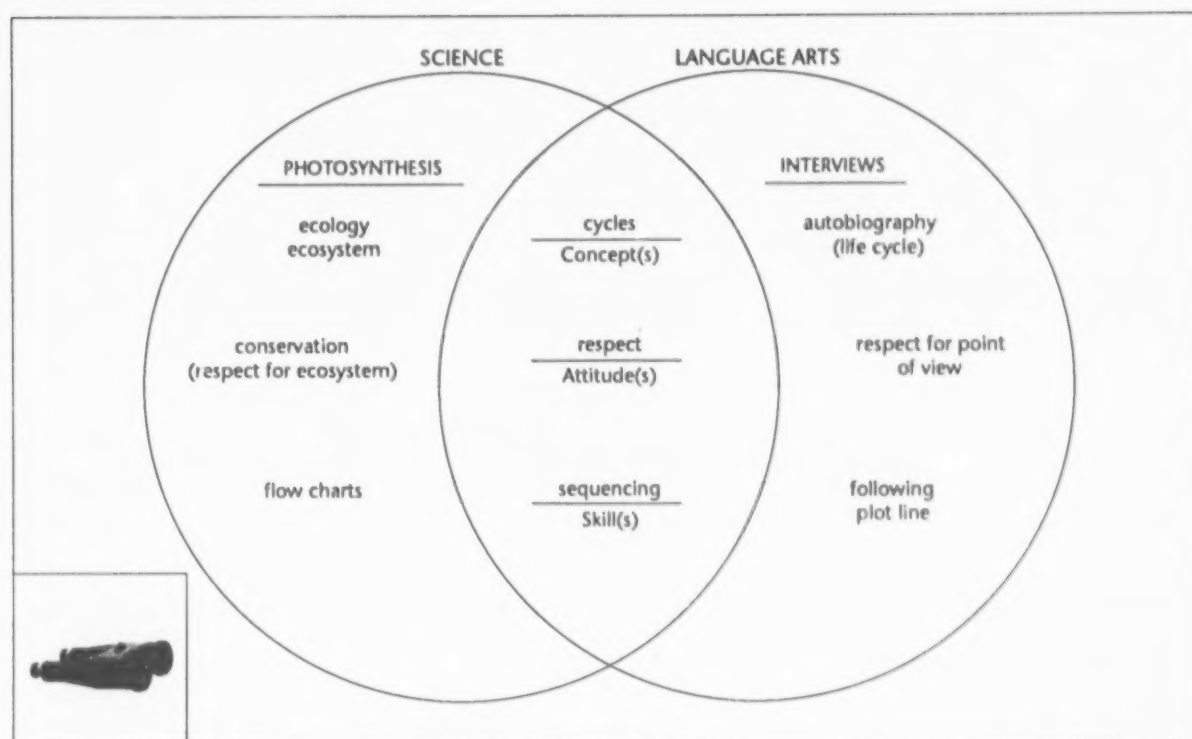


Figure 7 The Shared Model: Curriculum Viewed Through Binoculars

forward curriculum planning model for less experienced teachers to grasp. It also facilitates teamwork planning as cross-departmental teams work to weave a theme into all content areas. The

thematic approach or webbed model provides a visible and motivational umbrella for students. It is easy for them to see how different activities and ideas are connected.

CONCEPTS	TOPICS	CATEGORIES
Freedom	The Individual	Animal stories
Cooperation	Society	Biographies
Challenge	Community	Adventure
Conflict	Relationships	Science fiction
Discovery	The World Wars	The Renaissance
Culture	The Pacific Rim	Medieval Times
Change	Partnerships	The Impressionists
Argument & evidence		Great Books
Perseverance		

Figure 8 Themes

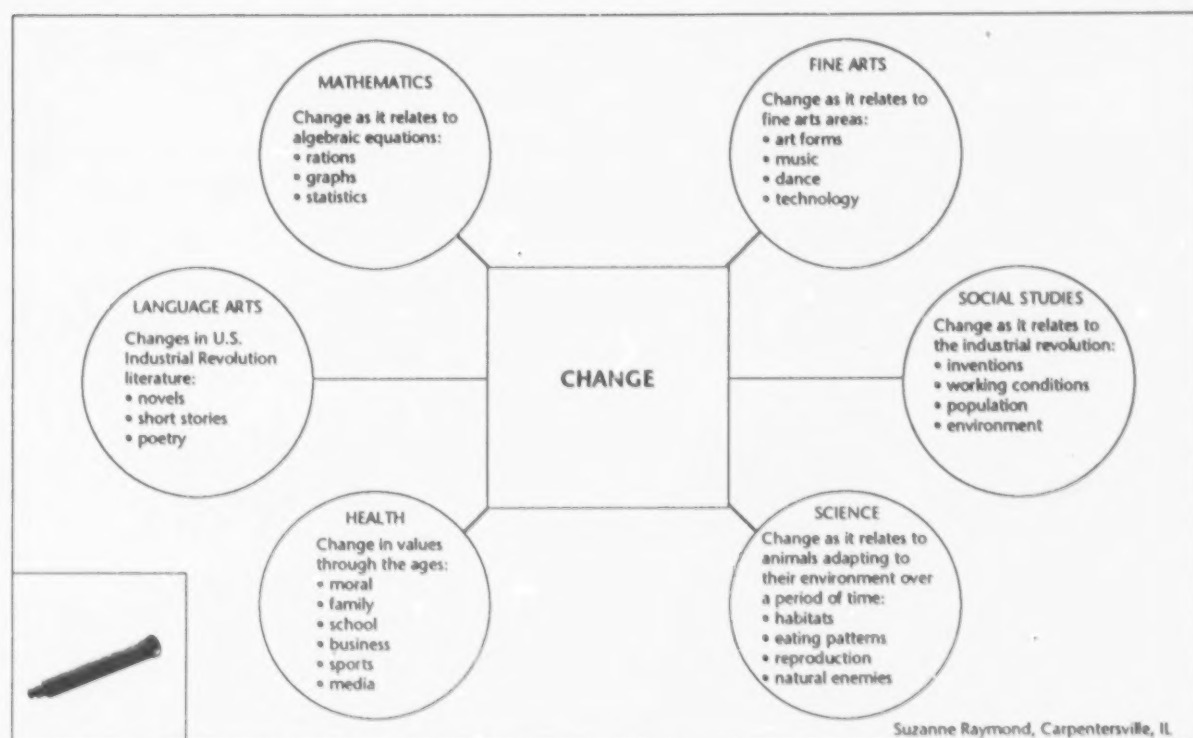


Figure 9 The Webbed Model: Curriculum Viewed Through a Telescope

The most serious difficulty with the webbed model lies in the selection of a theme. There is a tendency to grab at shallow themes that are superficially useful in curriculum planning. Often these artificial themes lead to a contrived curriculum. Also, caution must be used not to sacrifice the logical and necessary scope and sequence inherent in some disciplines. In this model, teachers can get bogged down in curriculum writing that may not warrant the time involved as compared to the unlikelihood of long-term use of thematic units in years to come. (Usually a theme is not repeated.) Also, teachers can become focused on activities rather than on concept development in this model, so caution should be used to keep the content relevant and rigorous.

A webbed curriculum can be created in a brainstorming session (or a series of brainstorming sessions) by an interdisciplinary team, which analyzes and selects a theme that meets some pre-established criteria. Such a theme functions as an overlay to the various content areas and a guide-

line for fully articulating an interdisciplinary curricular unit. (See Figure 9.)

Notes & Reflections

The webbed model for integrating curricula requires a team approach and takes time to develop. Summer curriculum-writing time provides a rich opportunity to initiate this model. That is when teachers have the time to explore theme options fully and set criteria for quality. This model takes extensive planning and coordination between the various departments and special subject areas. It's a great model to use when trying a two- to four-week interdisciplinary pilot unit. Because of the intense planning needed to implement this model well, it is advisable to start with a manageable piece of the curriculum.

In this webbed model, a theme provides a fresh lens with which to frame and view content. The theme acts as a common umbrella that is visible to students as they work in the various content areas, and is an easy integration model for the learner.

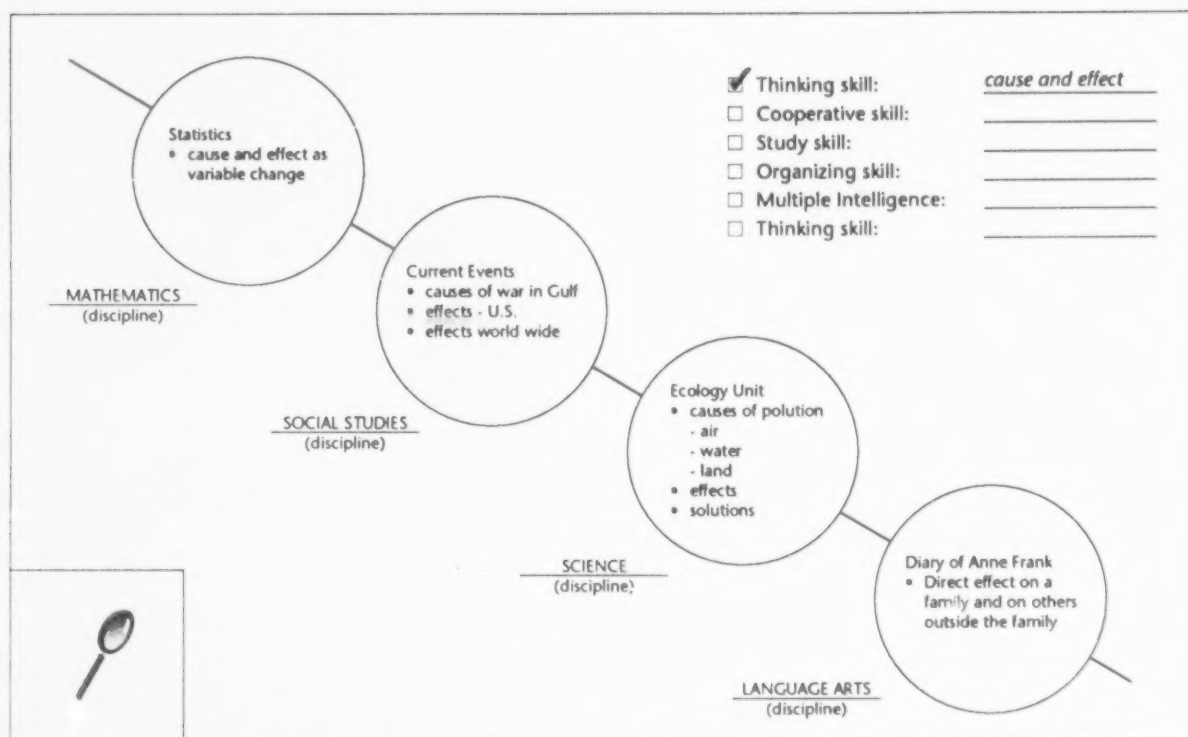


Figure 10 The Threaded Model: Curriculum Viewed Through A Magnifying Glass

MODEL SEVEN THREADED: Viewed Through a Magnifying Glass

The great end of an education is to discipline rather than to furnish the mind. To train it to the use of its own powers rather than to fill it with the accumulation of others'.—Tryon Edwards

The threaded model of curricular integration is viewed through a magnifying glass, in which the "big ideas" are enlarged throughout all content with a metacurricular approach. This threaded model of curricular integration focuses on the metacurriculum that contains or intersects with the very heart of any and all subject matter content.

For example, prediction is a skill used to estimate in Math, forecast on the basis of current events, anticipate in a novel, and hypothesize in the Science lab. Consensus-seeking strategies are used in resolving conflicts in any problem-solving situation. These skills are, in essence, threaded through

standard curricular content. As the thinking skills, social skills, research skills, and organizational skills are threaded into the content, the teacher asks questions such as: "How did you think of that?" "What thinking skill did you find most helpful?" "How well did your group work today?" and "How did you organize your data?" These processing questions contrast sharply with the usual cognitive questions such as, "What answer did you get?" and "How many agree with that answer?"

Advantages of the threaded model revolve around the concept of the metacurriculum. This metacurriculum involves an awareness and control of the tools of thinking and learning that go beyond the subject matter content. Teachers stress the metacognitive behavior, so students learn about how they are learning. By making students aware of the learning processes, future transfer is facilitated. The plus of this model is that the content stays pure for each discipline, and the students reap the added benefit of a superordinate kind of thinking that has transfer power for life skills.

A disadvantage of the threaded model is the necessity of adding "another" curriculum. Content connections across subject matter may not be addressed explicitly. The metacurriculum surfaces, but the disciplines remain static, unless articulation across the discipline is carefully orchestrated.

The connections between and among the subject matter content surfaces. Also, in order to thread the metacurriculum through the content, all teachers need an understanding of those skills and strategies, so additional training may be required to prepare for this infusion model.

Threaded curricula are created by interdisciplinary or grade-level teams, which target a thinking skill, cooperative skill, a research or organizational skill, or one of the multiple intelligences, and thread that skill through curricular content in all four disciplines. Finding appropriate skills or clusters of skills that fit easily and naturally with the various content areas is essential to this approach. (See Figure 10.)

Notes & Reflections

Threading the various meta skills through the subject matter content takes some consensus among the team members. However, there is no "watering down" of content in the respective disciplines. It is an amiable teaching model with positive outcomes for students.

The threaded model is used to integrate curricula when a metacurriculum is a mission focus. This model is appropriate to use as one of the alternative steps toward more intense subject matter integration. The threaded model is easier to "sell" to hard-core curriculum advocates who are reluctant to shift subject matter priorities. Therefore, this becomes a viable senior high school model to start with, as teachers keep their content intact and infuse thinking, cooperating, and multiple intelligences into that content.

MODEL EIGHT

INTEGRATED: Viewed Through a Kaleidoscope

I call a complete and generous education that which fits [an individual] to perform justly, skillfully, and magnanimously all the offices, both private and public, of peace and war.—John Milton

The integrated model of curricular integration is viewed through a kaleidoscope in which interdisciplinary topics are rearranged around overlapping concepts. The emergent patterns and designs provide the model with an authentic integrated approach to curriculum.

In the elementary classroom, an integrated model that illustrates the critical elements of this approach is the whole language movement in which reading, writing, listening, and speaking skills spring from a holistic, literature-based program that taps all the energies of the learner and the disciplines. Whole language is a philosophy of learning that embraces an integrated curriculum as opposed to the more traditional, fragmented models. Whole language is designed with the learner as the focus, while fragmented models are designed with the content as the focal point. At the middle school and secondary levels, this model requires extensive articulation among team members.

A distinct advantage of the integrated model is the ease with which the learner is led to the interconnectedness of and interrelationships between the various disciplines. The integrated model builds understanding across departments and fosters appreciation of staff knowledge and expertise. The integrated model, when successfully implemented, approaches the ideal learning environment for an integrated day externally and for an integrated learner focus internally. The integrated model also carries with it an inherent motivational factor as students and ideas gain momentum from class to class.

However, it is a difficult, sophisticated model to implement fully. This integrated model requires highly skilled staff, confident in the priority concepts, skills, and attitudes that pervade their respective disciplines. In addition, the integrated curriculum requires interdepartmental teams with blocks of planning and teaching time in common, which often means major restructuring of schedules. To integrate curricula with explicit attention to the genuine conceptual priorities of each discipline requires the commitment of myriad resources.

Integrated curricula of this kind are constructed by interdisciplinary or grade level teams, which discuss conceptual priorities for each discipline, and look for overlaps in concepts, skills, and attitudes, as well as

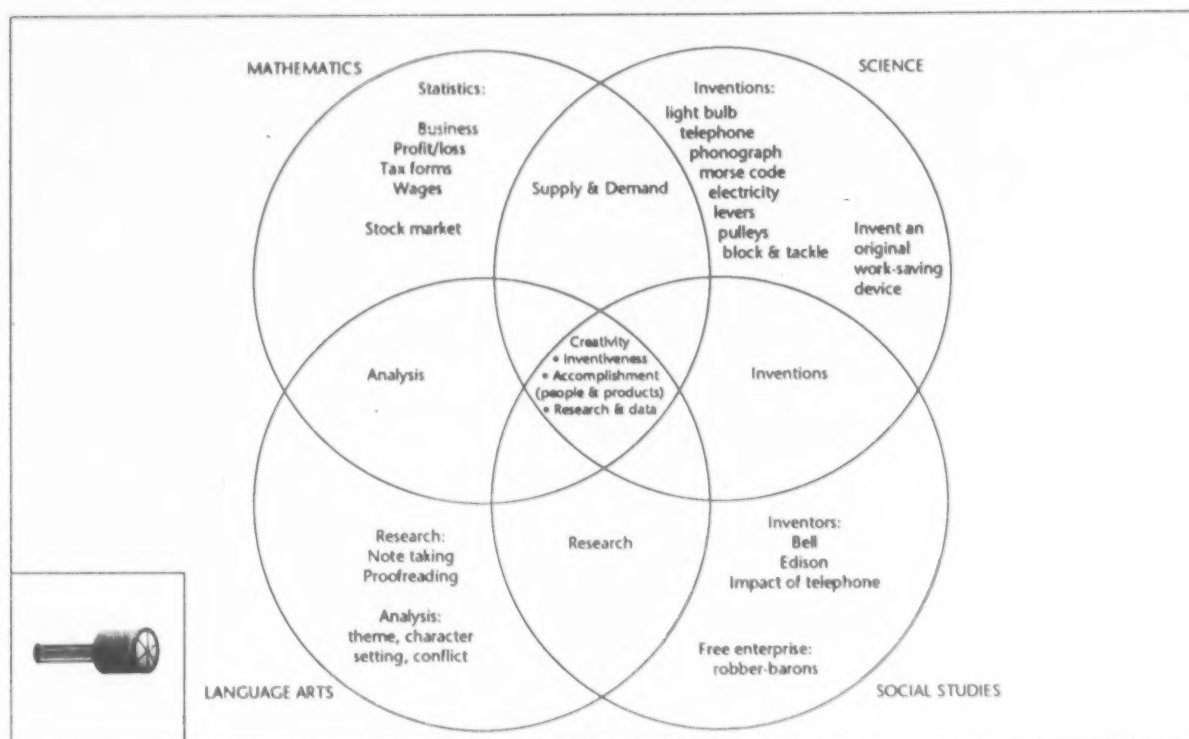


Figure 11 The Integrated Model: Curriculum Viewed Through a Kaleidoscope

content and design. In such an integrated curriculum, the content becomes the vehicle to carry the more generic pieces that have true transfer power. (See Figure 11.)

Notes & Reflections

Using their content priorities, team members look at the topics to integrate the concepts, skills, and attitudes into their separate disciplines. Armed with these basics, the team looks for the overlapping ideas and similarities between the content pieces.

This integrated model is most appropriately used with cross-departmental team volunteers who are willing to commit time and energy. It is helpful to start with a small pilot project such as a three- to four-week unit. Summer curriculum-writing time or release time is most likely necessary to fully explore this model.

Once a pilot is in place, further team commitment can be made. But, a word of caution is needed here. Start small. As team members work together learning about the other disciplines and the other team mem-

bers, units can be planned for longer periods of time. But this is a gradual process of building confidence and trust as team curriculum designers.

MODEL NINE

IMMERSED: Viewed Through a Microscope

The one real object of education is to have a [person] in the condition of continually asking questions.

—Bishop Mondell Creighton

The immersed model of curricular integration is viewed in an intensely singular and personal way. It allows microscopic examination as all content is filtered through the lens of interest and expertise.

A six-year-old first-grader writes incessantly about butterflies, bugs, spiders, insects, and creepy crawlers of all sorts. Her art work is modeled on the symmetrical design of ladybugs and the patterns of butterflies. She counts and mounts, frames and sings about them. Her interest in insect biology is already consuming

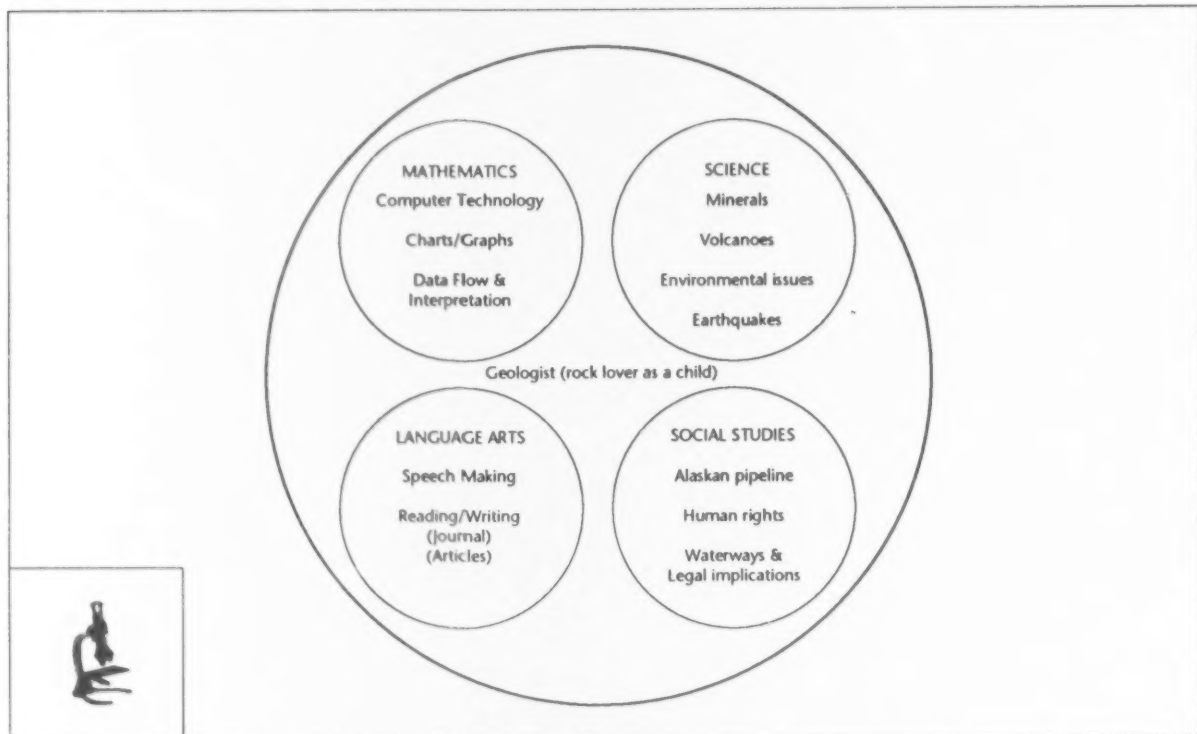


Figure 12 The Immersed Model: Curriculum Viewed Through a Microscope

her. The books she chooses reflect the internal integration of her interests in learning about her subject. Of course, the aficionado is found in all grade levels and in every discipline.

The ultimate advantage is that integration takes place within the learner. The learner is self-driven by an insatiable hunger to understand. As the student digs deeper into a field of interest, the related areas and new pathways seem unending. Actually, the immersed learner exhibits phenomenal discipline as he or she develops this intense focus. Of course, another plus is that the connection-making of this learner is often made explicit to other learners as the expert makes advances in the field.

A disadvantage may be that the filtering of all ideas through a single lens may occur too prematurely or too narrowly. Richness of experience and broad bases from which to review a specialization bring depth and dimension to the learner's perspective. A liberal and diverse background provides fertile ground for enriching this learner's experience. The more varied,

the better, at least early in the educational process. There is plenty of time to specialize later. (See Figure 12.)

Notes & Reflections

The immersed learner funnels most learning through his or her area of interest. This learner uses a refined selection process that automatically screens input and seeks out the areas that have explicit or implicit connections. The more expert, the more fine-tuned the selection process.

This model is not prescribed through a deliberate plan. The immersed model of integration just seems to happen. One cannot engineer the internal integration. It resides solely within the learner. However, once this form of integration is noted, the teaching team can certainly facilitate the fusion process with calculated synthesis. Broad, varied content, unified with overriding skills, concepts, and attitudes work well with this immersed learner, who automatically sees lots of connections.

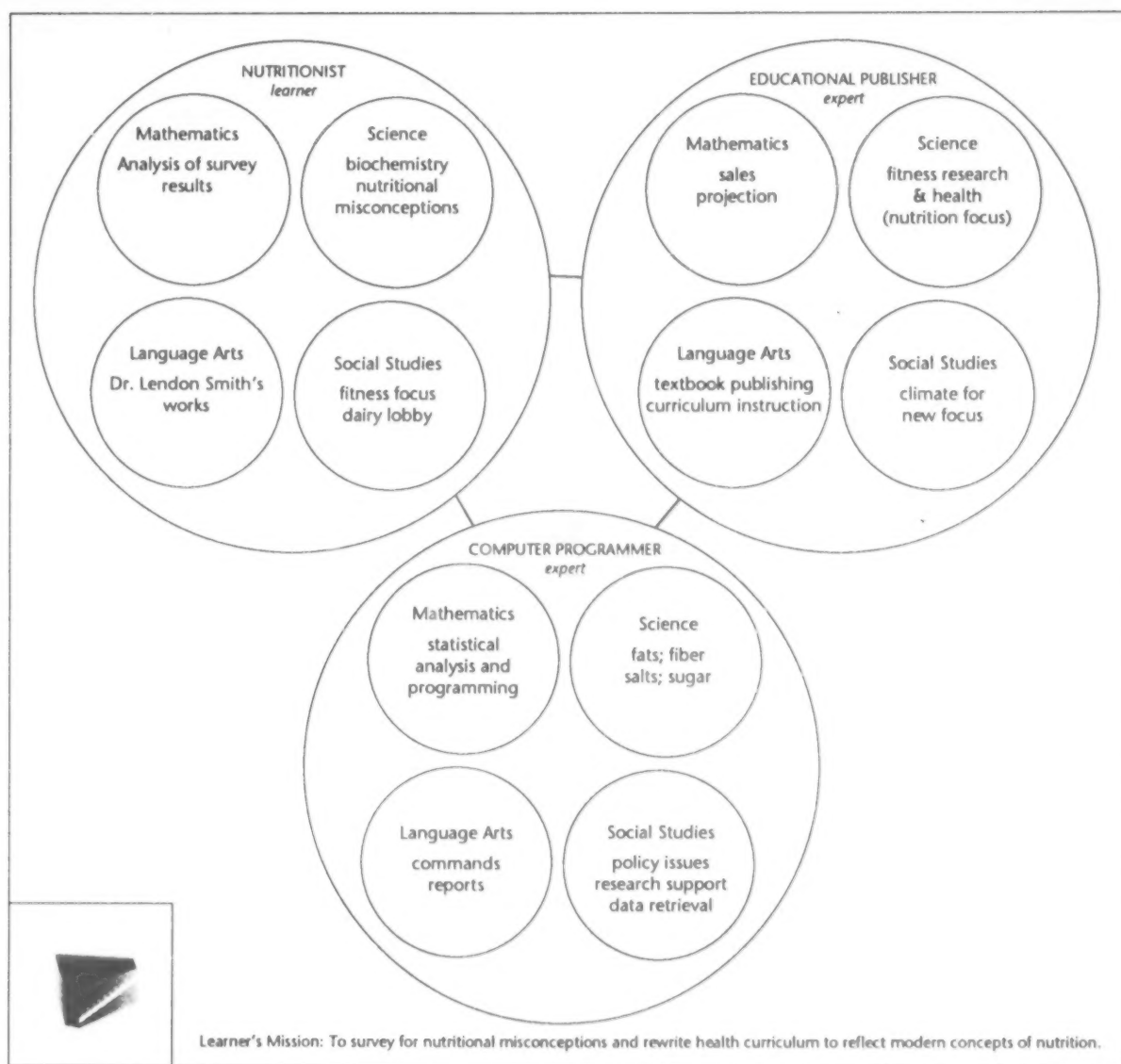


Figure 13 The Networked Model: Curriculum Viewed Through a Prism

MODEL TEN

NETWORKED: Viewed Through a Prism

The education of a man is never completed until he dies.—Robert E. Lee

The networked model of integration is viewed through a prism, creating multiple dimensions and directions of focus. Learning is filtered through the expert's eye, making internal connections that lead to external networks in related fields. The networked

model is like a three- or four-way conference call that provides various avenues of exploration.

Imagine a fifth grader who has had a keen interest in Indians since his toddler days of playing cowboys and Indians. His passion for Indian lore leads him into historical readings—both fictional and non-fictional. His family, well aware of his fascination with Indians, hears about an archaeological dig that recruits youngsters to actually participate in the dig as part of a summer program offered by a local college. As a result of this summer "camp," this learner meets

people in a number of fields: an anthropologist, geologist, archaeologist, and an illustrator, student of the fine arts, hired to represent the dig in drawings. This learner's networks are already taking shape. His natural interest has led him to others in the field who offer various levels of knowledge and insight that extend his learning.

The advantages of the networked model are many. This integrated learning approach is extremely proactive in nature, with the learner self-initiating the searches and following the newly emerging paths. The learner is stimulated with relevant information, skill, or concepts that move his learning along. The pluses of this model, however, cannot be imposed on the learner, but rather must emerge from within. However, mentors can and do provide the necessary models to support this sophisticated stage of learning.

The minuses of the networked model are familiar to those who have developed many diverse interests in their labor of love. It is easy to get sidetracked into one of the side ideas. It is also possible to get in over your head. A particular path seems inviting and useful, but suddenly becomes overwhelming. The benefits no longer outweigh the drawbacks. Another disadvantage is that the networked model, if taken to extremes, can spread interests too thin and dilute a concentrated effort. (See Figure 13.)

Notes & Reflections

Learners are propelled by their areas of interest to search out experts both inside and outside the field, in order to extend and enrich the field.

This model, like the immersed model, often moves the onus of integration to the learner rather than to an outside instructional designer. However, it is an appropriate model to present to motivated learners. Tutors or mentors often suggest networking to extend the learner's horizons or provide a needed perspective. As networks evolve, serendipitous connections appear along the way. Often,

these accidental findings propel the learner into new depths in the field or actually lead to the creation of a more specialized field. One such example in modern science, of course, is the field of genetics, which has developed an area known as genetic engineering. This unfolding of a field is really the result of immersed expert learners networking with other immersed expert learners.

CONCLUSION

To view curricula only as segmented and separate, "we cheapen our goals by cutting them down to accessible size and separating them from a concept beyond infinity. It is as though we are preparing for Beethoven by listening to hyenas."

—Norman Cousins

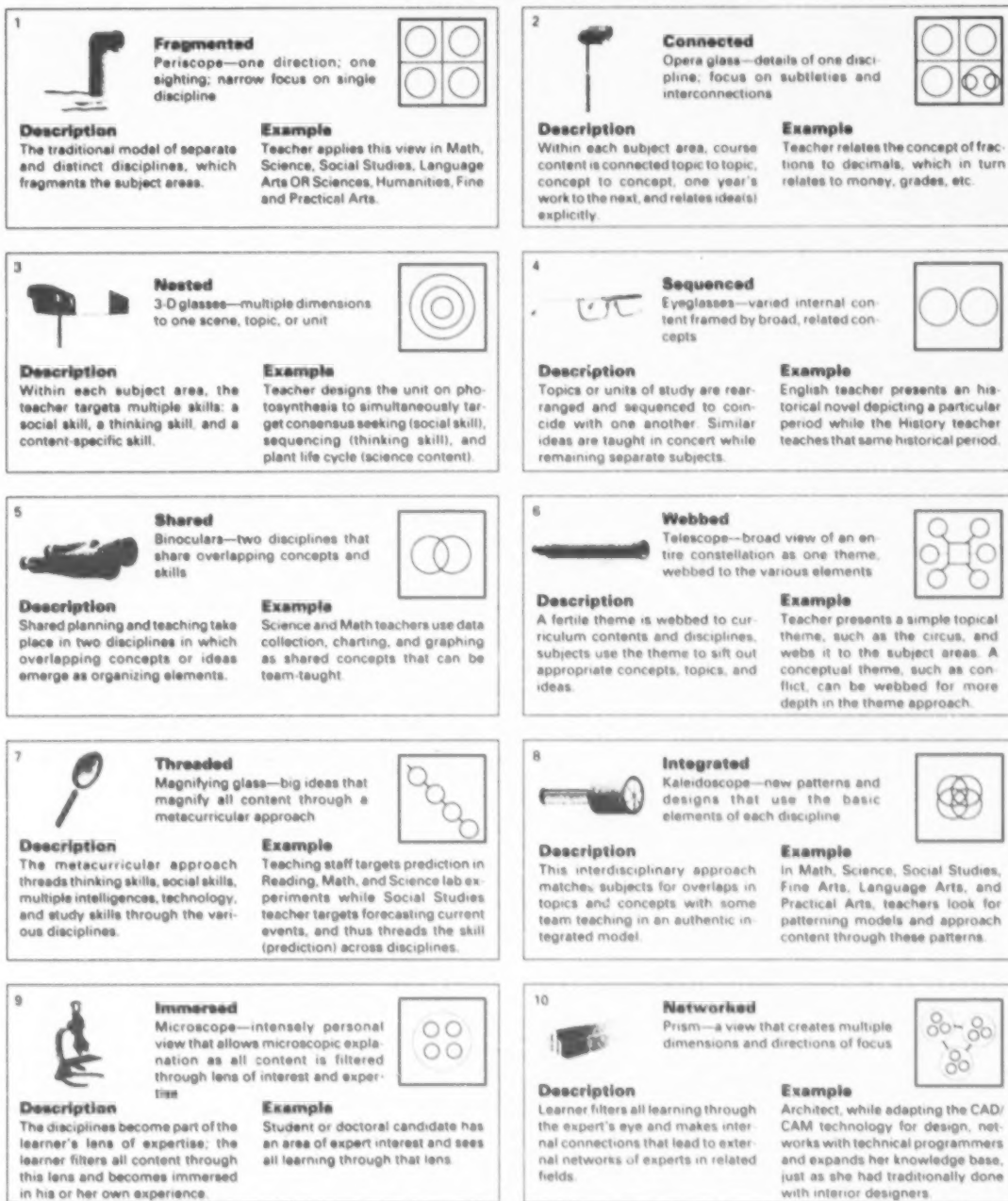
The models presented are just beginnings. Teachers can use and reuse them as they conceptualize and reconceptualize "What's worth teaching?" and "How do I best present that to students?" In addition to these models, teachers can invent their own designs for integrating the curriculum.

Whether you are working alone, with partners, or in teams, the organizers provide immediate and visible transfer of the models into useful prototypes. In fact, a faculty can easily work over time to develop integrated curricula throughout the school. Each staff member or team can choose one model to work with each semester. As teachers begin the conversation about integrating the curriculum, the spectrum of models becomes more inviting. Alternatively, students themselves can work with the models to explore the connections they make within and across disciplines and within and across learners.

The process never ends. It is a cycle that offers renewed energy to each school year as teachers help "the young mind...[discover] roots running underground whereby contrary and remote things cohere and flower out from one stem."

Toward an Integrated Curriculum

Ten Views for Integrating the Curricula: How Do You See It?



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*Extrapolated from "Design Options for an Integrated Curriculum" by Heidi Hayes Jacobs in *Interdisciplinary Curriculum*, ASCD, 1989.

Figure 14 Ten Views for Integrating the Curricula

REFERENCES

- Bellanca, J. (1991). *The cooperative think tank*. Palatine, IL: Skylight Publishing.
- Bellanca, J., & Fogarty, R. (1991). *Blueprints for thinking in the cooperative classroom*. (Second Edition). Palatine, IL: Skylight Publishing.
- Beyer, B. (1987). *Practical strategies for the teaching of thinking*. Boston: Allyn and Bacon.
- Bloom, B.S. (Ed.) (1956). *Taxonomy of educational objectives: The classification of educational goals, handbook 1: Cognitive domain*. New York: David MacKay.
- Bruner, J. (1975). *Toward a theory of instruction*. Cambridge: Belknap Press.
- Carbol, B. (1990). *The intermediate program: Learning in British Columbia*. Victoria, BC: Ministry of Education, Educational Programs.
- Cogitare, Newsletter of the ASCD Network on Teaching Thinking*. (1991). Integrating curriculum, 5(2).
- Costa, A. L. (1988, Winter). What human beings do when they behave intelligently and how they become so. *California ASCD Journal*, 1(1). (Original Title: Search for Intelligent Life.)
- Eisner, E. (1991, February). What really counts in schools. *Educational Leadership*, 48(5), 10-11, 14-17.
- Elvin, L. (1977). *The place of common sense in educational thought*. London: Unwin Educational Books.
- Fogarty, R. (1990). *Designs for cooperative interactions*. Palatine, IL: Skylight Publishing.
- Fogarty, R. (1989). From training to transfer: The role of creativity in the adult learner. Doctoral Dissertation: Loyola University of Chicago.
- Fogarty, R. & Bellanca, J. (1989). *Patterns for thinking: Patterns for transfer*. Palatine, IL: Skylight Publishing.
- Fullan, M. (1982). *The meaning of educational change*. New York: Teachers College Press.
- Hirst, P. H. (1964). *Knowledge and curriculum*. London: Routledge and Kegan Paul.
- Hirst, P. H., & Peters, R. S. (1974). The curriculum. In E. Eisner and E. Vallance, (Eds.). *Conflicting conceptions of curriculum*. Berkeley, CA: McCutchen.
- Jacobs, H. H. (1990). *Interdisciplinary curriculum: Design and implementation*. Washington, D.C.: Association for Supervision and Curriculum Development.
- Jacobs, H. H., & Borland, J. H. (1986, Fall). The interdisciplinary concept model: Theory and practice. *Gifted Child Quarterly*, 30(4), 159-163.
- Jones, B. F., Palincsar, A., Ogle, D. S., & Carr, E. G. (1987). *Strategic teaching and learning: Cognitive instruction in the content areas*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Jones, B. F., Tinzmann, M., Friedman, L., & Walker, B. (1987). *Teaching thinking skills: English/language arts*. Washington, D.C.: National Educational Association.
- Joyce, B., & Showers, B. (1983). *Power and staff development through research and training*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Lawton, D. (1975). *Class, culture, and curriculum*. Boston: Routledge and Kegan Paul.
- Lazear, D. (1991). *Seven ways of knowing*. Palatine, IL: Skylight Publishing.
- Lazear, D. (1991). *Seven ways of teaching*. Palatine, IL: Skylight Publishing.
- Meeth, L. R. (1978). Interdisciplinary studies: Integration of knowledge and experience. *Change*, 10, 6-9.
- Perkins, D. N. (1987). Thinking frames: A model for teaching thinking. In J. Baron & R. Sternberg (Eds.). *Teaching thinking skills: Theory and practice*. (pp. 41-61). New York: WH Freeman.
- Perkins, D. N. (1986). *Knowledge as design*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Perkins, D. N., & Salomon, C. (1989). Are cognitive skills context bound? *Educational Researcher*, 18(1), 16-25.
- Perkins, D. N., & Salomon, C. (1988, September). Teaching for transfer. *Educational Leadership*, 46(1), 22-32.
- Piaget, J. (1972). *The epistemology of interdisciplinary relationships*. Paris: Organization for Economic Cooperation and Development.

LEARNING FOR A LIFETIME

- Posner, M. I., & Keele, S. W. (1973). Skill learning. In R. M. W. Travers (Ed.), *Second handbook of research on teaching*. (pp. 805-831). Chicago: Rand McNally.
- Ravitch, D. (1985). Why educators resist a basic required curriculum. In B. Gross & R. Gross, (Eds.). *The great school debate*. New York: Simon and Schuster.
- Ravitch, D., & Finn, C. (1985). The humanities: A truly challenging course of study. In B. Gross & R. Gross, (Eds.). *The great school debate*. New York: Simon and Schuster.
- Resnick, L. B., & Klopfer, L. (1989). *Toward the thinking curriculum: Current cognitive research*. 1989 ASCD year-book. Washington, D.C.: Association for Supervision and Curriculum Development.
- Richards, M.C. (1980). *The public school and the education of the whole person*. Philadelphia and New York: The Pilgrim Press.
- Vars, G. F. (1987). *Interdisciplinary teaching in the middle grades*. Columbus, OH: National Middle School Association.

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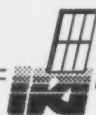
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ISBN 0-932935-36-2

ISBN 0-932935-36-2



9 780932 935366

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200 E. Wood Street, Suite 274
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304

IF MINDS MATTER

A Foreword to the Future



Edited by
Arthur Costa, James Bellanca,
and Robin Fogarty

vol. II

PS 022858

IF MINDS MATTER

A Foreword to the Future

Volume Two

EDITED BY

Arthur L. Costa

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Skylight Publishing, Inc.
Palatine, Illinois

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If Minds Matter: A Foreword to the Future Volume Two

First Printing

Published by Skylight Publishing, Inc.
200 E. Wood Street, Suite 274, Palatine, Illinois 60067
800-348-4474 (in northern Illinois 708-991-6300)
FAX 708-991-6420

Editing: Julia E. Noblitt, Naomi Cohn, Lorraine Murray, Sharon Nowakowski, Marijke Rijsberman
Type Composition: Donna Ramirez
Book Design: Bruce Leckie
Cover Design: David Stockman
Typesetting: Bruce Leckie, Jamie Bellanca, Donna Ramirez

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Printed in the United States of America
ISBN 0-932935-40-0

ACKNOWLEDGMENTS

The orchestration required to publish a two-volume collection—involving four dozen authors who are scattered throughout the continental United States, Hawaii, and into the provinces of Canada—has been a monumental task. Naturally, a project of this scope involves the cooperation and commitment of the players at every level of the production process. However, one person is ultimately in charge; there is only one conductor. In this production of *If Minds Matter: A Foreword to the Future*, that one person has been Julia Noblitt, Senior Editor. Thanks to her expertise, the various elements were gingerly synchronized: assignments were set, monitored, revised, juggled, and adjusted and the production schedule was meticulously met. For this, we are forever indebted to Julie.

Responding to Julie's leadership, we would like to acknowledge the other key players instrumental in crafting these volumes. First, we'd like to thank the authors for their valiant efforts in following our guidelines, meeting our standards, and providing exceptional and enlightening text—all within stringent timelines. As in any concerted effort, the diversity and multitude of the various authored parts have created a synergy evidenced in the finished product.

In addition to the authoring efforts, we would like to acknowledge our production and editing staff for commendable teamwork: Naomi Cohn, Lorraine Murray, Sharon Nowakowski, and Marijke Rijsberman comprised our editorial team. Working at breakneck speed, and yet with the deliberation and care necessary for final copy, they skillfully edited the work of our authors. Also, a note of appreciation is in order for Sandi Schroeder for meeting our indexing needs.

To Bruce Leckie, lead designer on this project, we extend our thanks for the layout design and for the hours of fine tuning required to make it all fit. Working closely with him, we would like to acknowledge Jamie Bellanca for his patience in formatting and revising chapters that were each unique in style and form. Also, in the production and design department, we'd like to thank Donna Ramirez for her seemingly effortless ability to input a never-ending stream of text. And, a special thank you to Dave Stockman for his inspired cover design. We extend our appreciation to both Dave and Kim Overton for handling all the other production in progress. Without their efforts, making our publication deadlines would have been impossible.

Two final notes of appreciation must not be overlooked. At the earliest conception of the

project, we approached Ralph Tyler and asked if he would write an introduction to our work because of his esteemed and historic role in instruction and curriculum development. He graciously accepted our invitation and to him we are forever grateful. Similarly, at the close of the project, we approached Elliot Eisner and asked if he would write a foreword to our work because of his well-known role as a connoisseur in curriculum and program evalua-

tion. He, too, graciously accepted our invitation and to him we are also forever grateful.

In any extraordinary human endeavor, the results speak for themselves. Many hands and hearts have shaped these volumes ... as if minds mattered. To all involved in this labor of love, we thank you.

Art Costa,
James Bellanca &
Robin Fogarty

FOREWORD

At a time when American educators are being riddled by proposals to emphasize content as if it could be separated from the mental processes that give it meaning, *If Minds Matter: A Foreword to the Future* is welcome. From my perspective, the development, even the invention of mind is one of education's major aims. The term *invention* with respect to mind is not a common locution. The ordinary person views mind as something that humans are born with, just as they are born with hands and feet. The idea that mind is a form of cultural achievement, an invented process influenced by the opportunities a child has had to learn is not a common view. Yet, in a very real sense, mind is not something like brain: brain is biological but mind is significantly cultural. The curricula that we provide in schools, the ways in which we teach, the opportunities given to children in the course of their development are opportunities that shape the kinds of minds children will come to own. When we define the curriculum we are defining those opportunities. Decisions that educators and laypeople make about the content of school programs—what is included and what is left out—are decisions about the kinds of content about which children will have an opportunity to think and the kind of cognitive processes they

will have an opportunity to develop. Hence the educator's task in the broadest sense is to generate those conditions that bring mind into being, in part by recognizing the ways in which people can learn to think.

I said earlier that attention to the development of mind has not been salient in the current debate about the aims of education or the content of curriculum. The generally conservative picture of the mission of schools that now prevails is one that emphasizes the acquisition of information. Becoming "culturally literate" is, unfortunately, often related to the acquisition of dictionary knowledge concerning supposedly key events. While there is no question that the processes of thinking require a content, the content can be thought about in ways that are shallow or deep, imaginative or routine, analytic or pedestrian, integrated or fragmented. As Whitehead once said, the merely well-informed man is the greatest bore on earth.

Given the prevailing climate, we all need to remind ourselves that whatever children are able to become will be significantly influenced by the quality of the programs they encounter in school and the character of the teaching that mediates it. Like the systole and diastole of a beating heart, curriculum and teaching

are at the core of education. *If Minds Matter* reminds us of the importance of these processes and the creative role that teachers and educational policy makers can perform in shaping the opportunities children will have to invent their own minds.

The creation of those opportunities will in the final analysis require far more than attention to the curriculum per se, or to the quality of teaching. Neither curriculum nor teaching functions independently of the "biological" environment in which they are housed. The school is, in a sense, a kind of biological environment for curriculum and for teachers. The school provides its own constraints and its own incentives. What teachers are able to emphasize and what the curriculum can become is only in part influenced by our educational aspirations. It is also influenced by the habits that we as teachers harbor, the traditions within which schools function, and the expectations of the community and the students we teach. Put another way, our most noble aspirations to reform education so that mind can be invented in its fullest sense will be tempered by considerations beyond the classroom, indeed beyond the school itself. For example, the communities within which schools reside need to understand that the long-term goal of education is no small victory in an economic arms race with foreign nations, but the invention of the kind of mentality that our culture needs to remain viable, civil, and humane.

This mentality, in its best sense, is not some homogenized uniformity measurable through standardized achievement tests. At its very best, the practice of education cultivates what is distinctive, what is unique about individuals. It is through such uniqueness—what in other contexts I have called productive idiosyncrasy—that the culture itself thrives. A well-developed mind will possess unique features from which the culture is nourished. In a sense, we feed each other precisely from those unique personal aptitudes that we ourselves do not possess. Thus, the aims of education are closely related not only to the invention of mind, but to the invention of individual minds, minds that have a personal signature, minds that see and act upon the world in uniquely individual ways.

The aim of education is not the reduction of heterogeneity in the service of standard attainment, but just the opposite. The goal of schooling is to increase variability among the young while at the same time the magnitude of the mean.

Such an ambition will of course play havoc with simple efforts at assessment. It will create a labor-intensive demand in matters of evaluation, and it will de-standardize what we think schools ought to be about. It is not clear to me whether our own culture, steeped as it is in a meritocratic tradition, will be willing to accept such a personalistic view of the deepest ends of education. We have grown accustomed, I am afraid, to simple answers and to quantitative indices of achievement. We tend to import into education the language of the marketplace and the images of battle.

We need different metaphors, indeed different paradigms. We need images of education that harken to the kinder, gentler America we have heard about. I believe schools have a major contribution to make in realizing such a social ambition. Attention to the potential of mind as a primary educational aim is one of the important steps we can take to move in that direction. Yet as important as it is, it is a limited step. What we do or try to do in classrooms is only a part of the task. As educators, we need to direct our efforts toward the public at large so that they can help us alter the blinkered vision that now seems to drive our schools.

If Minds Matter is an important legitimization of the conviction that mind does indeed matter. Whether it can matter enough to shape school policies will depend not only on what we do in school, but what we can help our constituency come to understand about the deeper purposes of education. *If Minds Matter* has the potential to help us do that. If that potential is realized, it will certainly be an important contribution, not only to the educational literature but even more important, to the practice of education.

Elliot W. Eisner
Stanford University
February, 1992

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SECTION ONE

CREATING THE THOUGHTFUL CLASSROOM

INTRODUCTION	1
1 COGNITION IN PRACTICE <i>James Bellanca & Robin Fogarty</i>	3
Cognitive instruction research includes several major areas: explicit skill instruction, cognitive organizers, metacognition, and transfer of learning. Criteria for explicit instruction in thinking skills are examined and specific programs are categorized. Next, the emergence of cognitive organizers as significant cognitive tools is briefly noted. A substantial section on metacognition as a superordinate kind of thinking is also included. A metacognitive framework for planning, monitoring, and evaluating learning is explained. Finally, current work in the area of transfer of learning is discussed as cognitive instruction moves in a new direction.	
2 THE ART OF STRATEGIC CONNECTIONS <i>Faye Brownlie</i>	23
Thinking is the bridge that links students' experiences with the curriculum. This bridge is activated by the use of teaching/learning strategies in the classroom. This chapter weaves the attributes of a thoughtful classroom with the attributes of a strategy, then moves on to discuss implementation issues: How do teachers begin to use strategies in their teaching? How do teachers monitor the strategies they teach? How can students be involved in monitoring the effectiveness of the strategies they are learning?	
3 CREATING THE THOUGHTFUL CLASSROOM <i>Jean Speer Cameron</i>	33
<i>Creating the Thoughtful Classroom</i> describes the change process and the staff development component used by a suburban K-12 school district to facilitate the use of instructional strategies that promote thinking. The article demonstrates that an entire district can move forward in an area of focus when careful attention is given to the change process.	
4 COGNITION AND COOPERATION: PARTNERS IN EXCELLENCE <i>Jacqueline Rhoades & Margaret McCabe</i>	43
This chapter focuses on enhancing the development of higher-order thinking skills through the use of cooperative learning strategies. Content includes a definition of "higher-order thinking" skills; what thinking paths are and how they are developed;	

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relationship between "frame of reference" and thinking paths; how cooperative learning inherently enhances thinking skills; and how specific cooperative techniques can be structured to purposefully enhance student thinking.

5 THE NINE BASICS OF TEACHING THINKING *David Perkins & Robert Swartz* 53

From research and experience, the authors synthesize nine basic principles for teaching thinking and expand on their implications. The nine principles are: thinking suffers from unfortunate default patterns; thinking with the help of explicit thinking organizers, verbal and graphic, can counter these; infusion of thinking-oriented instruction into content area instruction serves students best; skills, processes, and dispositions all need cultivation; better thinking needs to be addressed explicitly; metacognition requires careful attention; transfer requires careful attention; a serious time commitment to thinking as well as content is important; and continuing staff development is an imperative.

6 MIND TOOLS FOR MATTERS OF THE MIND *Jay McTighe & Frank T. Lyman* 71

The authors offer three classroom scenarios (elementary, middle, and high school) illustrating the applications of various theory-embedded tools. Characteristics of theory-embedded tools, tangible devices that assist thinking and learning; and cognitive cues that signal classroom actions and interactions are then discussed. These tools and their associated cues present a valid, concrete, relevant, and practical system for involving students from nursery school through graduate school in the active processing of ideas. The body of the chapter describes nine specific "cognitive tools" that have served as catalysts for creating responsive, thoughtful classrooms in which students are actively involved in constructing meaning.

7 MEANING IS THE METHOD: WHOLE LANGUAGE IN THE THOUGHTFUL CLASSROOM *Laura Lipton* 91

Whole language instruction is presented as a developmental, holistic, meaning-making methodology. Classroom climate, teacher behaviors, instructional activities, and curriculum are addressed from that perspective. The teaching/learning relationship, positive learning experiences in developing literacy, and reading as a problem-solving strategy provide the primary foci.

8 INTERACTIVE STRATEGIES FOR ENHANCING THINKING AND WRITING *Carol Booth Olson* 101

This article presents a wide range of interactive strategies for thinking and writing about literature including clustering, dialectical journals, found poetry, guided imagery, showing, not telling, and more. The goal of these strategies is to provide tools for reflection so that, rather than relying on the teacher's interpretation, students can make their own meaning from texts. When students experience a literary text in a variety of interactive ways, their emotional investment in the text is greater and their writing about the text is richer.

9 CONVERTING AT-RISK STUDENTS INTO REFLECTIVE LEARNERS *Stanley Pogrow* 117

This article describes the conditions under which at-risk students can be converted into successful, reflective, academic learners. Large scale experience with the higher-order thinking skills (HOTS) program has shown that most at-risk students have high levels of intellectual ability. However, they suffer from a debilitating learning deficit wherein they do not have a sense of what it means to understand symbolic ideas. The key to overcoming this understanding deficit is to first provide extensive general thinking activities, and then limited amounts of high-quality thinking in content. The latter requires an innovative curriculum taught by very good teachers who have been trained in Socratic techniques. A practical implementation plan is described, along with conditions of effectiveness.

10 MULTIPLE INTELLIGENCES THEORY: CREATING THE THOUGHTFUL CLASSROOM *Noel White, Tina Blythe, & Howard Gardner* 127

Gardner's theory of multiple intelligences (MI Theory) maintains that intellectual development involves more than a single, genetically determined capacity. We all possess several distinct capacities for solving problems and creating products, including linguistic, logical-mathematical, musical, spatial, bodily-kinesthetic, interpersonal, and intrapersonal intel-

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ligences. The particular context of schools favors certain abilities over others. The standard curriculum stresses language and logic; other capacities receive only cursory acknowledgment despite their importance in other contexts, especially later in life. MI Theory suggests educational practices that diverge considerably from the current push toward standardization of curriculum, pedagogy, and assessment. In particular, MI Theory calls for broadening the school curriculum, emphasizing the divergent paths that students can take toward understanding, and diversifying assessment.

11 SEVEN WAYS OF KNOWING *David Lazear* 135

This chapter is concerned with practical implications of the theory of multiple intelligences for restructuring schools in three areas. The first is the curriculum (teaching **FOR** multiple intelligences). We need to be sure that the basic skills/capacities of the different ways of knowing are being taught in our schools. Second is instructional practices and methodologies (teaching **WITH** multiple intelligences). We need to be presenting academic material in a wide variety of ways to address and stimulate all intelligence areas. The third concern is reinventing the learning process itself (teaching **ABOUT** multiple intelligences). Here we are concerned not only with helping students learn about their multiple ways of knowing, but with such things as assessment of various intelligence strengths and weaknesses, as well as assessing academic progress using multiple intelligences.

12 THE MINDFUL MIDDLE SCHOOL: A SHIFTING PARADIGM *Elliot Y. Merenbloom* 151

Unique opportunities exist in the middle school classroom for teaching thinking. Fundamental aspects of the middle school concept include a curriculum model that integrates content, skills, and personal development as well as team approaches to instruction. Within this milieu, strategies appropriate for teaching thinking include: clarifying purposes; providing motivation, readiness, and goal-setting; utilizing recall strategies; providing transitions; moving from concrete to abstract; using wait-time; facilitating student-to-student interaction; assigning team tasks; creating simulation and game techniques; and focusing on affective issues.

13 CLASSROOM 2001: EVOLUTION, NOT REVOLUTION *James Bellanca* 161

What will classrooms look like in 2001? The author shows how the best instructional practices used by outstanding practitioners in today's classrooms could become the norm in the next century. He identifies the major blocks to this evolution and suggests a practical vision for the classroom in the year 2001.

SECTION TWO

CREATING COOPERATIVE LEARNERS

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14 COOPERATIVE LEARNING: A THEORY BASE *David W. Johnson & Roger T. Johnson* 169

The use of cooperative learning in schools is unique in its theoretical and research support. The comparison of cooperative, competitive, and individualistic efforts is the oldest research tradition in American social psychology. The impact of cooperative learning on a wide variety of educational outcomes has been studied. One set of outcomes involves effort to achieve. A second set of outcomes involves interpersonal attraction, desegregation, mainstreaming, and social support. A third set of outcomes involves psychological adjustment and health, social competencies, and self-esteem. The validity, breadth, and power of social interdependence theory make it a key aspect of schooling. The use of cooperative learning is part of changing schools from a competitive/individualistic to a high-performance cooperative-team organizational structure.

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- 15 **BUILDING A RESEARCH SYNTHESIS** *James Bellanca & Robin Fogarty* 189
 Cooperative learning research presents a powerful portrait of a teaching-learning model. No other model has the quantity, the reliability, the consistency, the breadth, or the depth of research to support its effectiveness with learning across age levels and content areas. Within the "body of research," a variety of cooperative learning "schools" highlight different approaches and strategies, debate values, and emphasize unique attributes. This article presents both the "big picture" and the characteristics of each model.
- 16 **BUILDING A CARING, COOPERATIVE CLASSROOM** *James Bellanca* 201
 After identifying the reasons why many of today's children have low-self-esteem and seem to be self-centered individualists, the author shows how primary teachers can teach the social skills of caring, responsibility, and cooperation *integrated* into a thoughtful curriculum. Early intervention and explicit attention to social skills instruction provides the basis for cooperative interactions throughout the school years and into life outside the classroom.
- 17 **DEVELOPING RESPONSIBILITY THROUGH COOPERATION**
Margaret McCabe & Jacqueline Rhoades 209
 If we expect our students to be responsible, we must provide the opportunity for them to learn and practice responsibility. Incorporating elements of Cooperative Meeting Management into the classroom provides that opportunity. Understanding the stages of group development, establishing clear standards, and providing a safe environment are the first steps. Introducing roles that encourage, and even require, the concept of distributed leadership, equal responsibility, and the importance of each member of the group lead to students developing a sense of responsibility in general, and responsibility for one's own learning in particular.
- 18 **THE POWER AND THE PROMISE OF COOPERATIVE LEARNING** *Marie Meyer* 221
 Education for the year 2000 and beyond cannot be passive. Learning must be active, creative, holistic, and collaborative. Cooperative learning has the power and the promise to transfer teaching and learning beyond the classroom walls to the family, to the community, to the voting booth, and to the workplace. It is more than just another method for instruction. The philosophy and conceptual model is preparation for a world characterized by interdependence, pluralism, conflict, and rapid change. In this chapter the success stories of high school teachers practicing the cooperative learning model represent the transformation that is taking place for both students and teachers.
- 19 **COOPERATIVE LEARNING: A NATURAL WAY TO LEARN** *David Schumaker* 231
 A brief overview of the author's detailed method of cooperative lesson design based on Dr. Costa's "Input - Process - Output - Metacognition" model of thinking lessons. The author gives an example of the lesson design from an Earth Science lesson. Further details of his cooperative learning techniques are provided, including those for homework, reading assignments, classroom rules, as well as specific examples of cooperative lessons for various disciplines. A discussion of the misuse of cooperative learning concludes the chapter.
- 20 **LESSONS LEARNED IN A COOPERATIVE COLLEGE CLASSROOM**
Martha E. Crosby & Dara Lee Howard 243
 A college faculty team of two describe their initial experience with cooperative learning in an advanced computer class. The focus is on the lessons they learned: you don't have to be perfect; adjustment time is needed; interaction tempers the classroom; cooperative rewards are needed; dark clouds have silver linings; you can structure for success; logistical nightmares do improve; and support is welcomed. The chapter concludes with benefits and barriers.
- 21 **COOPERATIVE LEARNING WITH ADULT LEARNERS** *Therese Bissen Bard* 251
 This chapter traces the experiences of a faculty member who has experimented in cooperative learning with students in a graduate professional school, The School of Library and Information Studies, University of Hawaii at Manoa, for almost eighteen years.

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Emphasis is on: planning courses at the graduate level for cooperative learning; teaching methods; strategies and techniques; and problems involved with cooperative learning.

22 AN AGENDA FOR ALL SEASONS *James Bellanca* 261

Cooperative learning provides unparalleled opportunities for a teacher to develop the cognitive model of student thoughtfulness and mastery of content in triple agenda lessons. Cooperative learning lessons that focus learners on completing drill and skill objectives fall short of the method's potential. Examples of primary, middle, and secondary lessons illustrate the differences between lessons with recall outcomes vs. those that have a dual agenda of cooperative and content outcomes as well as those with a triple agenda of content and cognitive and cooperative outcomes.

SECTION THREE

ASSESSING SIGNIFICANT OUTCOMES

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23 REASSESSING ASSESSMENT *Arthur L. Costa & Bena Kallick* 275

If we are teaching to enhance students' thinking, then we need to find ways to assess students' growth in multi-dimensional ways that match our instructional goals. This chapter looks at assessment issues we are really interested in: the reasoning behind a person's answer; how students behave when they don't know the answers to questions; and how students produce knowledge as much as how they reproduce knowledge. The authors suggest that teachers become researchers of student thinking—and become interested in the design of assessment instruments that measure highly complex processes.

24 FINDING OUT WHAT WE NEED TO KNOW *Sharon Jeroski* 281

Evaluation is the most powerful way that teachers and students express their values and beliefs. This chapter looks at a learner-focused approach to assessment and evaluation, where the emphasis is on supporting learning and enhancing development. Vignettes and examples of students' work from primary, intermediate, and secondary classrooms focus on three topics: evaluating what we value; students and teachers working together; and using collections of student work to track change.

25 HOW TO GRADE (IF YOU MUST) *James Bellanca* 297

Many practitioners see letter and number grades assigned to students' thinking and cooperating as incompatible. In this chapter, the author recommends that teachers not waste energy fighting over grades; rather, he advocates that teachers focus on substantive efforts to develop the thinking and cooperation of all students. To satisfy the grading pressures, the author shows how to attach grades to criteria and indicators of success for the products of student thinking and the behaviors of cooperation.

26 EVALUATION: A COLLABORATIVE PROCESS *Bena Kallick* 313

Evaluation is not something that is "done to you"—a final judgment. Rather, evaluation is done with you—you are a collaborator in the process. This chapter deals with strategies to help students develop criteria regarding their work and learn how to converse with teachers about their work. In addition, other ways to encourage evaluation as a collaborative process are suggested: collaborations between students, teachers, departments, administrators, boards of education, and parents. The focus is on ways to increase participation in the evaluation process as a way to raise standards.

27 HOW DO WE KNOW WE'RE GETTING BETTER? *Sharon Jeroski & Faye Brownlie* 321

Assessment practices should focus on authentic achievements. This chapter describes real accomplishments of active, responsive readers who are engaged with texts and activities that are meaningful to them. Sample strategies and student responses illustrate promising

practices in classroom assessment where students are encouraged to: make critical choices about reading, responding, and representing; make connections to previous knowledge and experience; personalize their responses to deepen their understanding; and engage in thoughtful interactions. Samples are drawn from a variety of contexts in elementary school classrooms.

28 **ASSESSMENT: A THOUGHTFUL PROCESS** *Steven Ferrara & Jay McTighe* 337

This chapter describes a systematic process for planning and conducting more thoughtful and sound classroom assessments. The authors briefly describe assessment methods appropriate for use by classroom teachers, organized in a Framework of Assessment Approaches. They examine principles of sound classroom assessment and present an Assessment Planning Chart. They also illustrate the planning process, framework, planning chart, and seven of the assessment methods in use.

29 **THE MOST SIGNIFICANT OUTCOME** *Robin Fogarty* 349

Accepting the premise that transfer of learning is the most significant learner outcome, this chapter outlines a model for tracking and assessing that transfer. Transfer of learning is depicted along a continuum that includes six situational dispositions toward transfer: overlooking, duplicating, replicating, integrating, mapping, and innovating. Each disposition is illustrated metaphorically and specific student behaviors are listed for teachers to look for and listen for as they systematically track student transfer. Key metacognitive questions are suggested to move students along the transfer continuum. In closing, it is suggested that the model may be used as a metacognitive tool for student self-assessment.

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INTRODUCTION

Ralph Tyler

Profound changes have taken place in educational thought since the beginning of the 20th century. In earlier times, social change was relatively slow and the school was generally viewed as the institution to teach children the information and skills of the adults so that the children would be able to take their places and carry on successfully the activities of their parents' generation. However, the increasing tempo of change in American society has resulted in a situation in which each new generation faces problems not faced by their parents. Schools that only prepared children to carry on the activities of their parents and to meet the problems that their parents had encountered became inadequate.

Fortunately, at the beginning of the 20th century a few educators recognized the need for new conceptions of the tasks and procedures of schools that took into account such social change. In their speaking and writing, they led the development of a reformulation of the role and practices of a school that would be appropriate for a constantly changing society. Four major emphases were stressed in this formulation. (1) The role of the school is no longer that of preparing the child to fit

into a static society, but is to educate students to take part in improving society. (2) The curriculum of the school should no longer focus on the memorization of facts and the development of fixed habits, but should emphasize identifying and solving social problems and developing constructive, flexible habits. (3) The activities of the school should no longer be largely limited to reading, listening, and repetitive practice, but should include experiences in which children work cooperatively with others in socially important learning activities carried on beyond the classroom. (4) The evaluation of student learning should no longer be largely restricted to paper-and-pencil tests, but should be based mainly on the child's work in conducting and completing projects requiring the use of the learning that schools are expected to teach.

This reformulation has been developed by educators who are continually seeking to make educational thought and practice appropriate for the needs of society. Perhaps twenty percent of American educators have these views to guide their work. Fifty years hence, it is likely that as many as eighty percent of American public schools will be undertaking such changes.

EDUCATING FOR THE 21ST CENTURY

This book not only defines and describes these profound changes in educational thought but also presents examples of how these changes are em-

bodied in excellent schools and other learning communities. It is an important and exciting presentation.

SECTION ONE

CREATING THE THOUGHTFUL CLASSROOM

"How was your day, Kate?" asked her mother.

"Great!" Kate beamed. "I got two hundreds."

"Oh, that's wonderful. For what?"

"I spelled out the words I memorized and I circled all the right state flowers."

"That's great," said Kate's mother.

[Later that day.] *"I'm pleased to report that Kate does excellent work," said the fourth-grade teacher. "She is a wonderful child. She has a record string of sixty-seven spelling words without a miss, and her seatwork is always 90-100% correct. Look here. She did so well matching the flowers and states."*

Mrs. Smith nodded. "That is very nice. She works hard every night to do the worksheets and memorize her vocabulary."

"Do you have any questions, Mrs. Smith?"

"Why yes. I was wondering about Kate's problem-solving skills. She doesn't seem to have much patience when I ask her to apply some of the math facts to actual problems."

"Oh, I wouldn't worry about that. She'll get the chance to do problem solving when she's older. Right now we are not as concerned about application as we are in building a base of knowledge and facts. There is just so much to cover."

In contrast to this teacher's defense of memorization of facts, the Minister of Intellectual Development for Venezuela, Luis Alberto Machado, stated in 1984 that the level of the development of a country is determined mostly by the level of development of its people's intelligence.

The schools of the 21st century have a commitment to the development of the mind as the central role. Gazing into an uncertain future, these mandates help us realize that fundamental to each student's productivity, happiness, and survival in the next century

will be a range of complex intellectual skills: the ability to seek, pose, and solve problems; to retrieve, organize, and derive meaning from a vast quantity of rapidly changing hi-tech information; to collaboratively envision, dream, and create new products and new solutions; and to be seriously concerned about the perspectives, conditions, and well-being of their fellow human beings.

This section opens with a research piece delineating the theoretical basis for instructional methodologies that highlight cognitive skills and strategies. As scenarios of thoughtful classrooms emerge, the picture includes: techniques for explicit skill instruction; strategies that employ graphic organizers to represent student thinking; and interactive methods that invite all students into the learning. One chapter discusses the role of technology as a thinking tool, while other chapters expand on the broader view of intelligence which suggests multiple ways of knowing. This section outlines cognitive strategies to foster thoughtful classrooms. It closes with two scenarios depicting future school models: a middle school as an emergent model for the next decade, and a portrait of an evolving classroom for the year 2001.

COGNITION IN PRACTICE

James Bellanca and Robin Fogarty

Cognitive instruction research embodies four distinct areas of study: explicit skill instruction, cognitive organizers, metacognition and transfer of learning. Each of these areas has its own body of literature as well as works that encompass all four areas.

EXPLICIT THINKING SKILLS

A steady current of experts favor explicit skill instruction for the thinking curriculum. In some areas, consensus among the many thinking skills advocates embodies these beliefs (Costa, 1985a):

- Thinking is most often taught indirectly, but a direct approach is needed.
- Learning how to think is not an automatic by-product of studying certain subjects.
- Students will not learn to think better simply by being asked to think about a subject or topic.
- Youngsters do not learn how to engage in critical thinking by themselves.
- There is little reason to believe that competency in critical thinking can be an incidental

outcome of instruction directed, or apparently directed, at other ends.

- Instructions for the skills must be direct and systematic prior to, during, and following students' introduction to and use of them in the classroom.

However, there seem to be two obstacles impeding the momentum of a stronger flow toward consensus on how to teach thinking explicitly. The first obstacle is a philosophical issue that must be addressed before the second obstacle can even be approached. This primary issue is the debate over whether explicit thinking skills should be taught separate from or infused into the existing subject area curriculum. There are, of course, pros and cons for each instance. (See Figure 1.)

Although both approaches are successfully implemented in various settings, we favor the infused model. Our focus is always and foremost on the *transfer of learning* for all children, and the infused model eases the way for fruitful transfer, creative application, and relevant student use throughout the curriculum. The separate model seems to reinforce for students the "little boxes" theory of curriculum: in little boxes, math is not art, art is not science, and think-

THINKING SKILLS PROGRAMS		
	PROS	CONS
Thinking Infused Into Content	• Easy transfer • Carries content	• Teachers may be unskilled in the teaching skills
Thinking Taught Separately	• Spot and slot for thinking • Targeted to test and grade • Easy staff development	• No Time • No transfer

Figure 1 Thinking Skills: Infused or Separate

ing is not any of these—the curricula are fragmented.

However, once the decision has been made in terms of how to deliberately include thinking in the curricula, the next obstacle stubbornly emerges: How does one know which program is best? An overview of the spectrum of thinking models provides some food for thought. Just as in cooperative

learning, the various programs tend to cluster into four distinct categories: the conceptual models, the strategic approaches, the curriculum packages, and the model-building designs. Figure 2 presents the thinking skill programs as they cluster in patterns.

The major categories that delineate the four types of thinking skills programs have definite characteristics that distinguish one from the other.

CLUSTERS OF THINKING SKILLS PROGRAMS	
CONCEPTUAL MODELS Patterns for Thinking—Patterns for Transfer - <i>Fogarty and Bellanca</i> Tactics in Thinking - <i>Marzano and Arredondo</i> Dimensions in Thinking - <i>Marzano</i> Thoughtful Education Training Series - <i>Hansen, Silver, and Strong</i> Teaching for Intelligent Behavior - <i>Costa</i> Models of Teaching - <i>Joyce & Weil</i>	CURRICULUM PACKAGES Philosophy in the Classroom - <i>Lipman et al.</i> Instrumental Enrichment - <i>Feuerstein</i> HOTS - <i>Pogrow</i> SOI - <i>Meeker</i> Great Books - <i>Will</i> Future Problem Solving - <i>Torrence</i> Odyssey - <i>Project Zero (Harvard)</i> Critical Thinking - <i>Black and Black</i>
STRATEGIC/SKILLS APPROACH CoRT - <i>de Bono</i> Catch Them Thinking - <i>Bellanca and Fogarty</i> Start Them Thinking - <i>Fogarty and Opeka</i> Teach Them Thinking - <i>Fogarty and Bellanca</i> Syntectics - <i>Gordon</i> Strategic Reasoning - <i>Upton</i> Practical Strategies for Teaching Thinking - <i>Beyer</i> Project Impact - <i>Winocur</i>	MODEL BUILDING WITH PROTOTYPES Knowledge as Design - <i>Perkins</i> Keep Them Thinking I, II, III - <i>Opeka, Fogarty, Bellanca</i> Breakthrough - <i>Jones</i> Guided Design - <i>Nardi, Wales</i> Connections - <i>Perkins et al.</i> Creative Problem Solving - <i>Parnes</i> Cooperative Think Tank - <i>Bellanca & Fogarty</i>

Figure 2 Major Categories of Thinking Skills Programs

Each program has a flavor of its own, yet each category is also easily recognized by its distinguishing critical attributes.

Conceptual Models

In the conceptual models, broad guidelines set the framework within which more specific ideas are set forth. For example, in *Patterns for Thinking—Patterns for Transfer*, the four broad guidelines framing the program are teaching *for*, *of*, *with*, and *about* thinking: setting the climate *for* thinking, teaching the explicit skills *of* thinking, structuring interactions to teach *with* thinking, and teaching metacognitively *about* thinking. Within that framework, specific thinking skills and strategies are used to demonstrate the conceptual model.

Likewise, in *Models of Teaching*, Joyce and Weil conceptualize instructional models into families: information processing, personal, social, and behavioral. Within that framework, specific models are explored. For example, within the personal family the synectics approach is elaborated. It begins with a scenario that presents the model, followed by an introduction to the basic structures, theory, demonstration, practice, and feedback. It ends with coaching and extended application that help teachers learn the instructional techniques.

While conceptual models allow great freedom on the part of the teacher for innovative and highly relevant content-specific use, less skilled or less confident staff may find the freedom within the conceptual structure too ambiguous.

Strategic/Skills Approach

The strategic/skills approach, on the other hand, provides tried and true, teacher-tested techniques that are ready for immediate use. In the strategic/skills approach, a menu of specific and fully delineated methods are presented to the teacher for explicit instructional use.

Usually, these strategies/skills are introduced in what is often called a "content-free" lesson. In reality, this content-free lesson does indeed have a content focus. However, the content is usually familiar, almost generic in nature. It is used merely as a vehicle to carry the strategy or skill under study.

For example, in teaching the explicit thinking skill of classification, the familiar content focus might be on solids, liquids, and gases. Using these generic categories, the classification skill, not the science, becomes the focus of the lesson.

Similarly, in teaching the strategy PMI (plus, minus, interesting), de Bono uses the generic or familiar content of buses. The initial lesson requires students to generate pluses, minuses, and interesting aspects of buses that have no seats. Again, by using content that is simple and well-known, the emphasis can be placed on the PMI strategy itself.

While the strategic/skills approach usually has immediate appeal to practitioners because it easily applies directly to the classroom, caution must be taken that the strategies and skills lessons are not merely used as a cutesy Friday afternoon activity. If the strategy or skill is used only once as modeled in the teacher training, it is an *activity*. If, however, teachers introduce the strategy or skill as modeled, practice it in another situation, and transfer it into still another situation, then and only then can we call it a *strategy*. An activity is a one-time shot. A strategy is placed in our repertoire of instructional techniques, our tool kit to be used over and over, whenever appropriate.

Curriculum Packages

Curriculum packages provide a ready-made set of materials for classroom use. These materials are, more often than not, specifically designed for explicit instruction as separate and disparate pieces in the classroom. While the curriculum package provides a neat and tidy unit for deliberate placement in the instructional day, "a spot and a slot" for explicitly addressing thinking skills and strategies, often the subsequent transfer needed for continued and relevant use does not occur.

Examples of the curriculum packages might include Feuerstein's *Instrumental Enrichment*, in which specific and strategic thinking techniques are taught through pencil-and-paper tasks. By metacognitively processing and talking about how students approached a particular task, future application and transfer are mediated for the students.

CREATING THE THOUGHTFUL CLASSROOM

Another curriculum package is Lipman's *Philosophy for Children* program, in which skillfully written, highly motivating, and extremely relevant scenarios are used to engage students in Socratic dialogue. Using the fictional situations as springboards, further discussion is encouraged as students attempt to draw philosophical principles into other academic situations or into life's circumstances.

While curriculum packages have strong appeal because of their completeness as a package, their use can be limiting if transfer is not addressed with vigor.

Model Building with Prototypes

The final cluster of thinking skills programs, model building with prototypes, provides a generic piece or model as a prototype. That is, the generalizable model is presented through a content-specific lesson, with the implicit understanding that it is a model and should be used as such. Transfer to other content is built in explicitly. Examples of model building with prototypes are the *Breakthrough* program by Jones and *Knowledge as Design* by Perkins.

In the *Breakthrough* program, for example, a lesson on garbage is presented in a fully designed, ready-to-use lesson format. However, in model building a specific prototype is set up. The lesson features specific strategies for modeling collaborative learning, reciprocal teaching, and cognitive mapping. The expectation is that although garbage is the lesson's content focus, the real lesson extends beyond that with definite attention to instructional methodology.

Perkins' *Knowledge as Design* uses the same model-building approach. Perkins poses four questions that can be applied across content, subject matter, and life situations:

- What is its purpose (or purposes)?
- What is its structure?
- What are the model cases of it?
- What are arguments that explain and evaluate it?

Through these four questions, a model for thinking emerges. Perkins claims these questions can be

applied to ecology, Boyle's law, the Bill of Rights, and to understanding a common screwdriver.

THINKING SKILLS PROGRAMS

Briefly, without belaboring the decision-making processes that must be employed to reach consensus, there are some major considerations to weigh in the selection of a program. (See Figure 3.)

Considerations For Selecting a Program

- What is the purpose of the program?
- Should an explicit thinking skills program be introduced separate from or infused into the subject matter content?
- What are the experiences and competencies of the teachers?
- What are the available resources in terms of time and funds for training and materials?
- What is the commitment level for long-term change toward cognitive instruction?
- What kinds of results are expected?

How to Teach the Skills

After consideration of these key issues, program selection becomes easier. By targeting needs and expectations, several programs will seem more appropriate than others. Once the final choice is made, the subsequent decisions on how to teach the skills fall into place. A model of what is required to teach explicit thinking skills, according to Beyer (1987), is provided in Figure 4.

The research on the need for explicit attention to thinking in the curriculum is clear:

Knowing that...

- ...schools do make a difference (Edmonds, 1997),
- ...intelligence is modifiable (Feuerstein, 1980),
- ...learners can monitor and control their own performance (Brown, 1978),
- ...learners are active, strategic, planful, and constructive (Anderson, Hiebert, Scott, & Wilkinson, 1984),

THINKING SKILLS PROGRAMS		
Type	Pros	Cons
Conceptual Models	• Deep understanding results in creative application • Can easily adapt, mix, and match the best from many models	• Full commitment to long-term change from building or district • Needs explicit attention to transfer
Strategic/Skills Approach	• Easy for teachers to learn • Immediate application • Transfer power inherent (if noted explicitly)	• Can appear "cutesy" • Superficial activities rather than generic, transferable strategies for the instructional repertoire
Curriculum Packages	• Stand alone • Spot and slot in curriculum • Teacher's preparation minimal	• Narrow in focus • Needs (and often overlooks) attention to transfer • Separated from content; more to teach
Model Building with Prototypes	• Procedural learning or heuristics taught and modeled for easy application and transfer • Straightforward approach with transfer built in	• Can be narrow in focus • Transfer embedded but can be slighted

Figure 3 Pros and Cons of Thinking Skills Programs

then cognitive instruction must include explicitness in both the thinking skill and the transfer of the thinking skill.

COGNITIVE ORGANIZERS

The concept of cognitive organizers is rooted in Ausubel's (1978) theory of "meaningful reception

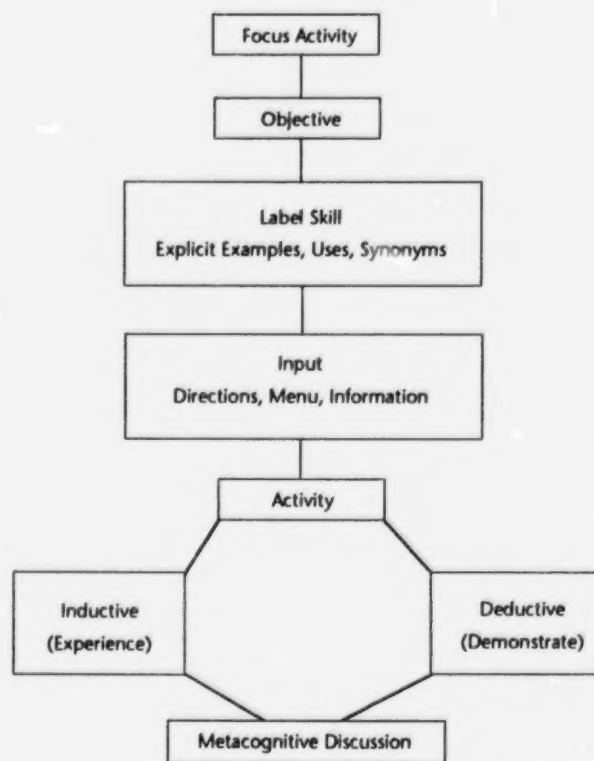
learning." Simply put, Ausubel believes that information is naturally stored hierarchically in the brain. For instance, highly generalized concepts seem to cluster together, followed by less inclusive concepts, and finally specific facts and details.

Ausubel advocates the idea of the advance organizer in which information is graphically displayed prior to the reading of the text. In Ausubel's terms,

HOW TO TEACH EXPLICIT SKILLS

1. Examples (or Products).
2. Introduction to components of the thinking skill in a systematic manner.
3. Demonstration of the basic attributes of the skill.
4. Discussion of the operation and how to do the operation.
5. Opportunity for related practice and feedback.
6. A broadening of the skill beyond the original components.
7. Generalization of the skill with application in a variety of situations.

EXPLICIT SKILL INFORMATION



(Based on Beyer's model)

Figure 4 Explicit Skill Instruction Model

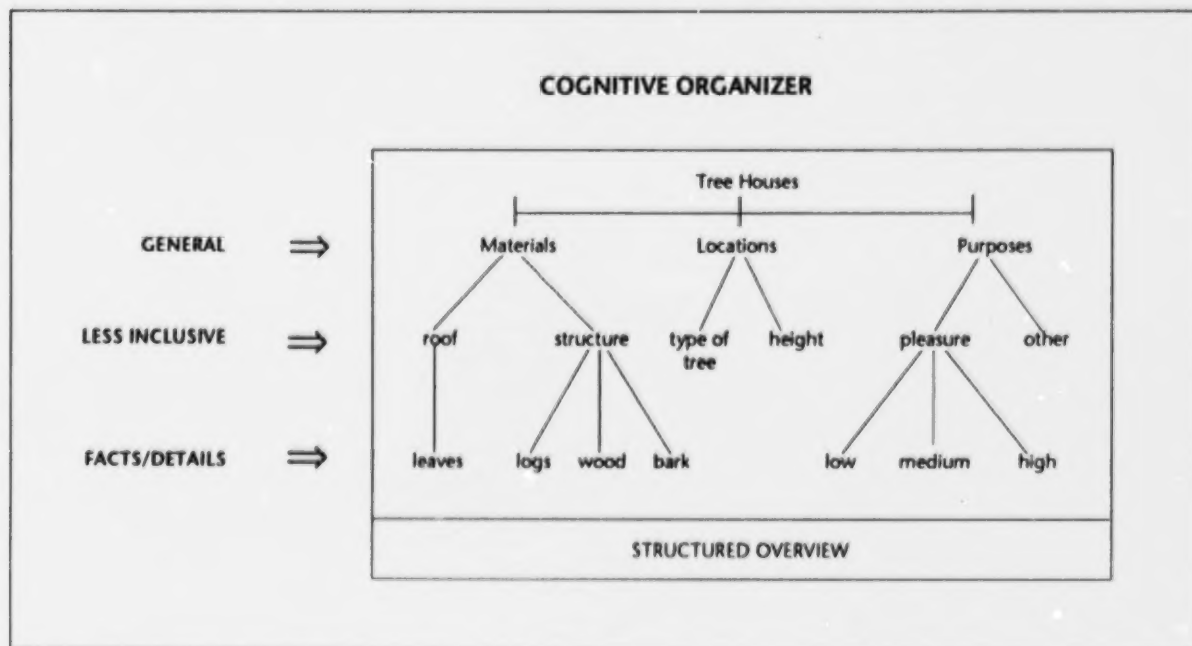


Figure 5 Structured Overview

this advance visual depicts information in hierarchical order and is called a *structured overview* (see Figure 5).

The structured overview always shows vocabulary in relation to more inclusive vocabulary. However don't think of the cognitive structure as passive. It is really quite dynamic. As new information and experiences are assimilated by the learner, it is re-organized cognitively and the graphic display reflects the shifts.

Mapping

Cognitive maps, or organizers, as studied by Armbruster and Anderson (1980), Dansereau et al. (1979), Davidson (1982), and Vaughn (1982), demonstrate success in improving the retention of information. Lyman and McTighe (1988) demonstrate the use of cognitive maps in a discussion of theory-embedded tools for cognitive instruction. They suggest that the ability to organize information and ideas is fundamental to thinking. Graphic displays or cognitive maps aid in the development of organizational skills for students of all ages and abilities across all content.

Cognitive organizers provide a holistic picture of the concept, complete with relationships and inter-relationships. Lyman and McTighe suggest that cognitive maps help students:

- represent abstract or implicit information in more concrete forms,
- depict the relationships between facts and concepts,
- generate elaborate ideas, and
- relate new information to prior knowledge.

Maps and Minds—Together

From kindergarten to college, cognitive organizers are employed to help students organize, retain, and assimilate concepts and ideas. Perhaps the most widely used cognitive organizer is the web, which targets a concept and provides structures for analyzing attributes. Other types of maps include sequence chains, vector charts, story maps, analogy links, flow charts, matrices, Venn diagrams, and ranking ladders. These cognitive organizers provide frameworks for class or small-group discus-

CREATING THE THOUGHTFUL CLASSROOM

sions and written work. According to Lyman and McTighe (1988), when used in conjunction with think-pair-share cooperative strategies and metacognitive cues, these cognitive maps are even more powerful in helping students learn.

Perhaps most importantly, the use of cognitive organizers provides a deliberate technique for allowing students to interact personally with the information. These theory-embedded tools, called maps, make the thinking visible for both the students and the teacher. Ausubel suggests that learning is easier for a person whose knowledge is clear, stable, and organized. Cognitive organizers facilitate just that sort of thinking—clear, stable, and organized.

METACOGNITION—A SUPERORDINATE KIND OF THINKING

According to Swartz and Perkins (1989), metacognition refers to knowledge about, awareness of, and control over one's own mind and thinking. Costa (1985a) calls this "thinking about thinking." Marzano and Arredondo (1986) also speak of awareness and control over one's own thinking, while Brown (1978) describes the metacognitive process in relationship to the reading process.

They allude to the good reader who reads and reads and suddenly hears a little voice inside his or her head saying, "I don't know what I just read." The words on the page had been read; they had been spoken in the mind, but in a "word-calling" sense, no meaning had been conveyed. Suddenly, the reader becomes aware of this deficit. Good readers realize they have lost contact with the context of the text, and their minds signal them to adapt a recovery strategy: reread the beginning of the paragraph, recall a thought, scan the text for key words...

On the other hand, poor readers read and read and read and never know they don't know. They don't notice that they are getting no meaning from the text because they never have gotten meaning from text. They word-call in their minds, but they are nonreaders in the real sense of reading.

Learning to understand and articulate our own mental processes is a necessary link to fruitful trans-

fer—or as Costa suggests about metacognition, having the ability to know what we know and what we don't know and wondering why we are doing what we are doing. That's the metacognition we want to promote for all learners.

More specifically, planning, monitoring, and evaluating the learning activity are the components of metacognitive processing. Students become aware of their own thinking and what goes on inside their heads when they are thinking prior to, during, and after a learning activity (see Figure 6).

In the current writings about metacognition, Swartz and Perkins (1989) gauge the sophistication of thinking by four distinctive levels that are increasingly metacognitive in nature (see Figure 7).

A sophisticated example of paying explicit attention to metacognition is seen in Whimbey's model (1975) of paired partner think-alouds. In this strategy, a problem solver thinks aloud as he or she works through a situation. The monitor cues thinking aloud with specific questions or prompts. Thus, instead of tacitly solving the problem, unaware of the strategies used, awareness is brought to a conscious level. In addition, over time, strategic use is mapped out by both the problem solver and the monitor as problem-solving patterns emerge. Reflective use is inherent in the think-aloud technique. In fact, all four metacognitive levels are clearly evidenced in the strategy.

By using metacognitive prompts we can help students monitor and direct their own thinking as they move toward reflective thinking. Beyond teaching about thinking, metacognitive questions also promote the kind of metaphorical thoughts, generalizations, and mindful abstractions that Perkins and Salomon (1988) suggest are powerful bridges for complex transfer.

In addition, Beyer elaborates on a cueing technique to prompt metacognition. Questions Beyer (1987) suggests to foster metacognitive behavior are:

- What am I doing?
- Why am I doing it?
- What other way can I do it?
- How does it work? Can I do it again or another way?

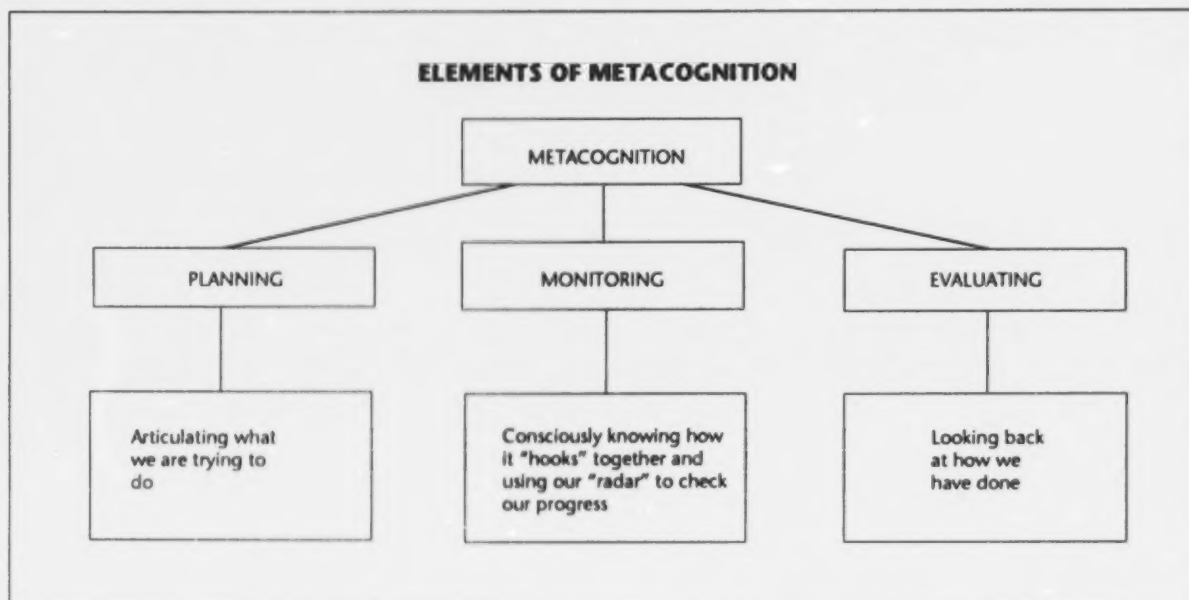


Figure 6 Elements of Metacognition

- How would I help someone else do it?

These questions and similar questions lead students to examine their own thinking and behavior in ways that press the generalization process. Additional lead-ins that may be discussed within the group or reflected upon individually in a log entry are:

- How is _____ like _____?

- I wish I'd known this when _____.
- Next time, I am going to...

Mrs. Potter's Questions (Fogarty & Bellanca, 1989) are standard metacognitive questions that promote reflective thinking and foster future applications. They are suggested for repeated use to process student thinking during cooperative learning tasks in the classroom.

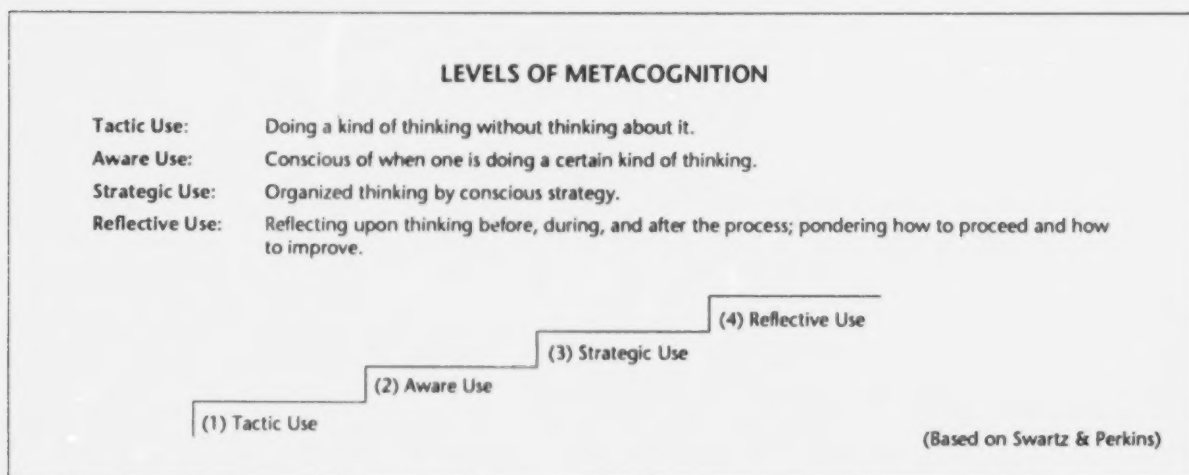


Figure 7 Levels of Metacognition

A METACOGNITIVE TOOL	
Affective: How did it feel?	
P(+)	
M(-)	
I(?)	

(PMI- based on de Bono's work)

Figure 8 PMI Chart

As the story goes, Mrs. Mimi Potter was Jim Bellanca's "critic" teacher when Jim was completing his student teaching in Champaign-Urbana, Illinois. In this high school English class, regardless of what lesson Jim taught or how successful the lesson seemed, Mrs. Potter would always sit Jim down and ask him to reflect on these questions:

What were you trying to do?

What do you think went well?

What would you do differently next time?

Do you need any help?

In the self-analysis and in answering these four questions, Jim was asked to reflect on his own teaching behavior for future transfer and successful use. Inadvertently, in Jim's own teaching situations, he discovered that he began asking the very same questions of his students. In turn, they became reflective about their own thinking and behavior in his classes. Mrs. Potter's Questions can be posted and used repeatedly as reminders of the metacognitive nature needed for the transfer process. They can easily become part of the processing that follows a cooperative task.

In addition, Beyer (1987) suggests modeling direct instruction of a thinking skill and thinking guides to promote planning, monitoring, and evaluating. A viable tool that students can readily use to assess their own behavior is a strategy based on de Bono's PMI (1970). In this procedure, students look at the affective, cognitive, and meta-

cognitive levels for processing their thinking. This evaluation is tied directly to the learning situation (see Figures 8 & 9).

Regardless of the means or measures used for the metacognitive process, the evidence is clear that explicit attention to the metacognitive—the stuff beyond the cognitive answers—promotes transfer and application of knowledge, skills, concepts, and positive attitudes in novel situations.

BO PEEP, LOST SHEEP, AND THE GOOD SHEPHERD—TALES OF TRANSFER

Isn't all learning for transfer? The question is so generic to the teaching/learning process, one wonders why talk of transfer has become this seemingly unending tale of controversy and confusion. To transfer learning means to use what is learned in one situation in another situation that is either quite like the initial learning situation or even perhaps quite different from the situation in which the learning originally took place.

That seems quite straightforward. In learning to drive one car, we, in essence, transfer that learning to driving all cars. In learning to survey a book, we learn the art of survey as an overview methodology. Of course, we learn things so we can use that learning in other places. Learning has relevance and usefulness.

However, as the tale of transfer unfolds, the complexity of the issue becomes more evident, and the concern for transfer takes on added dimensions. On the one hand, experts over the past twenty-five

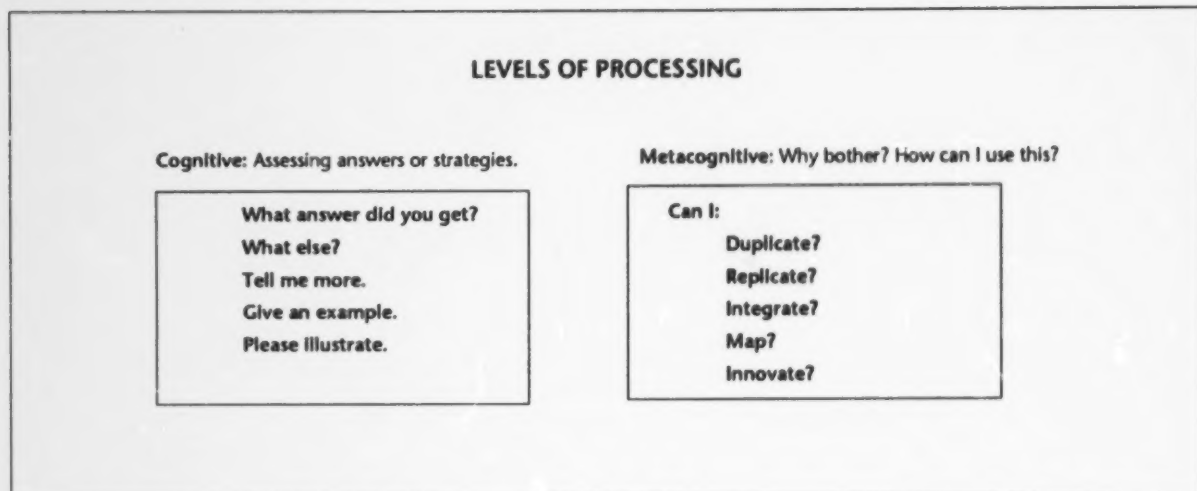


Figure 9 Comparing Cognitive and Metacognitive Questions

years seem to agree that there is a natural dichotomy to this concept called transfer. There appears to be transfer that is simple and another type of transfer that is more complex. The research suggests many terms to describe this dichotomy. For the simple transfer there is: simple (Fogarty, 1989), near (Wittrock, 1967), horizontal (Joyce & Showers, 1983), automatic (Perkins, 1986), lowroad (Perkins & Salomon, 1988), similar (Hunter, 1973; Beyer, 1987), spontaneous (Sternberg, 1984), and practiced (Feuerstein, 1980). For the complex trans-

fer there is: complex (Fogarty, 1989), far (Wittrock, 1967), vertical (Joyce & Showers, 1983), mindful (Perkins, 1986), highroad (Perkins & Salomon, 1988), cued (Beyer, 1987) guided and scaffolded (Sternberg, 1984), and mediated (Feuerstein, 1980) (see Figure 10).

This distinction between simple and complex transfer seems to be fairly easy to sense and deal with. Yet there is another dichotomy in thinking about transfer that takes precedence over all else. In fact, to explore the division in thinking, the con-

DICHOTOMY IN TRANSFER	
Low Level	High Level
simple	complex
near	far
horizontal	vertical
automatic	mindful
lowroad	highroad
similar	cued
spontaneous	guided and scaffolded
practiced	mediated

Figure 10 Types of Transfer

troversty over whether transfer is best served with generalized teaching rather than with teaching that has a content-specific focus, we must look historically into the issue.

Bo Peep Theory

"Leave them alone and they'll come home wagging their tails behind them." According to Perkins (1986), this represents the standard instructional practice today. It is the basic position that holds the educational community in its grip at the present time—teach the content, give students practice that is both immediate and spaced over time, and the transfer of learning is sure to follow.

For example, by teaching students the periodic table of elements and giving them practice in recognizing and analyzing the atomic structure of the elements, it is presumed that this factual information somehow transfers into relevant application. With sufficient and varied practice, this may actually occur. Then again, it may not. It may also be presumed that students who learn the periodic table of elements also somehow transfer concepts about patterns, symbolic notation, and about charting information by simply working with the actual table in fact-oriented tasks. While there is some possibility of the first presumption occurring as a result of varied practice, there is slim possibility of the second type of transfer occurring. Bo Peep has lost her sheep here.

Lost Sheep Theory

In fact, according to Fogarty, Perkins, and Barell (1991), over time, transfer has become the lost sheep of the education community. Let's unravel the tale from the beginning to see how this lost sheep theory has evolved to the point that it somehow overrides all other evidence.

Historically, the educational dogma dictating curricula adhered to the idea that Latin, geometry, and the like train the mind. However, in the early 1900s Thorndike and others presented convincing evidence that suggested that training the faculties indeed did not transfer in generalized ways. These researchers favored schooling in which the initial learning situation simulated as closely as possible the anticipated transfer situation. In fact, they advocated learning that encompassed identical elements

for the two situations. Training would be specific and transfer would occur.

Diametrically opposed to that view was the position advocated by Polya in the early 1900s that a general, generic, heuristic approach to problem solving in math was the key to the transfer of learning in diverse settings. The arguments for transfer from specific, similar contexts versus transfer from generalizable heuristics began. Unfortunately, buried within the embers of the fading controversy is one illuminating fact. Neither side—context-bound, specific training nor generalizable principles and rules—shows overwhelming and convincing evidence of transfer.

Perkins' summation: "Transfer ain't that great, right now. We're not getting the transfer we want." In fact, the transfer is so lacking and so rare that transfer has become what Perkins now calls the "lost sheep" of education. The attitude is: if it doesn't work, if we can't seem to get the transfer we want, then let's just do better in highly focused subject-oriented lessons. Thus, transfer has been ignored. If transfer can't be there, it's not a big issue. Let's just teach well what we can teach.

Good Shepherd Theory

Fortunately, the transfer embers, close to becoming forgotten ashes, have recently been stirred by the winds of curricular change. A number of voices from the thinking skills movement are focusing on the transfer issue again, igniting sparks of urgent concern and emerging agreements. While the controversy surrounding transfer as context-bound or transfer as generalizable remains a somewhat unresolved issue, agreements about transfer of learning do show evidence of promise for the educational community.

Teaching Latin does not seem to transfer inherently in terms of a more disciplined mind, yet it is now agreed that Latin may not have transferred because Latin had not been taught to cultivate transfer. And while teaching general heuristics such as steps to math problem solving do not seem to transfer into problem-solving steps in the writing process even though transfer had been expected, intricate and powerful implications have emerged from work in both areas.

TRANSFER TACTICS		
	ANTICIPATORY	RETRIEVAL
HIGHROAD	• abstracting rules • anticipating applications	• reflect by generalizing the problem • focus retrieval in one particular context • make metaphors
LOWROAD	• immediate practice • varied practice • matching lesson target and outcome	• varied practice performed over time (Based on David Perkins' work)

Figure 11 Transfer Tactics

In essence, what current transfer research suggests is that when teachers pay attention to transfer in contextual learning situations, transfer does occur. And when general, bare strategies are accompanied with self-monitoring techniques, transfer does in fact occur. In both context-bound teaching and a general heuristics approach, transfer must be shepherded.

Thus, there is Perkins' Good Shepherd theory: when transfer is provoked, practiced, and reflected on, transfer is fairly easy to get. Transfer can be mediated. With the Good Shepherd theory comes new hope for transfer. And with that new hope, of course, comes a new responsibility toward teaching for transfer—for after all, isn't all learning for transfer?

Hugging and Bridging for Transfer

To get transfer, to change Perkins' summation "transfer ain't that great, right now," to "transfer is greater than ever, right now," a close look at transfer reveals two critical elements that foster the transfer phenomenon. Perkins and Salomon (1988) refer to lowroad, automatic transfer and highroad, abstracted transfer. They further describe two mediation strategies for lowroad/highroad transfer which they label *hugging* and *bridging*.

Hugging means teaching so as to better meet the resemblance conditions for lowroad or automatic transfer. Bridging means teaching to better meet the conditions for highroad transfer by mediating the needed processes of abstraction and making connections (Perkins & Salomon, 1988).

While Beyer refers to mediation as cueing what to do, when to do it, and how to do it, his cues take the content lesson's thinking skills into new contexts. Perkins et al. (1989) further suggest that anticipatory tactics and retrieval tactics promote transfer (see Figure 11).

The Transfer Curriculum

In looking at the transfer of learning by adult learners in staff development programs, Joyce and Showers (1983) suggest that, while horizontal transfer shifts directly into the classroom teaching situation, vertical transfer requires adaptation to fit the conditions. Highroad transfer requires understanding the purpose and rationale of the skill and know-how to adapt it with executive control. Still, looking at adult learners, Fogarty (1989) suggests a continuum of transfer behavior within the dichotomy of simple and complex transfer. The learner levels, originally indicative of adult creative transfer, are also similarly applied to student transfer as depicted in Figures 12 and 13.

Awareness of the learner's transfer level and monitoring of that transfer through appropriate cueing questions seem to promote creative transfer, which is increasingly complex. For example, for the learner who is simply "duplicating" the learned skill or strategy, which is a somewhat low level of transfer, the teacher might cue with a question such as, "Can you think of an adjustment you can make so that this idea is useful in another context?" This cue may be enough to spark movement toward *replicated* transfer in which learners personally tailor the idea to suit their needs.

This reflective questioning based on transfer levels is analogous to a student who always draws figures in an identical way, almost as if they were produced in a cookie-cutter fashion. Simply by suggesting that the learner might change the eyes or hair on the figure, or even the size of it, the teacher propels the student toward creative divergence and more complex transfer. The metacognitive reflection questions can be self-monitored or peer-monitored with both adult and student learners. Note the shifts that are required as one wrestles with the transfer cueing questions in Figure 14.

Shepherding Transfer

Some of the current thinking on transfer is addressed by Perkins et al. (1989). They look at the topic of teaching for transfer as the key to more thoughtful instruction. By focusing curricula on the "somethings" to be transferred (the knowledge, skills, concepts, principles, attitudes, and dispositions) and the "somewheres" that teachers want

them transferred to (within content, across disciplines, and into life), instruction is expertly tailored by mediating the "somehows" of the hugging and bridging strategies.

By working with the model of "somethings" to transfer "somewhere," the instructional strategies of the "somehows" take on greater emphasis in the teaching/learning situation. In essence, the curricula is shaped with the pieces, which have what Fogarty calls transfer power, and teaching for transfer becomes an explicit part of the lesson (see Figure 15).

Knowing that the Bo Peep theory leads only to the loss of one of the key aspects of the learning situation, the transfer of learning; knowing that by ignoring transfer as the lost sheep of the instructional cycle, we again miss the essence of learning, which of course is the transfer, use, and application of learning in new settings; and knowing that if we pay attention to transfer and guide it like a good shepherd herds sheep, then we will take learning to new heights for learners of all ages and in all situations—knowing all this, we can pay attention to transfer, for isn't all learning for transfer?

CONCLUSION

The four realms of cognitive research tie together to provide practitioners with the tools to teach for thoughtfulness. Based on the context of teaching for transfer, these tools provide rich opportunity for teachers to shift from a conceptually poor recall agenda to a fertile format for mindfulness.

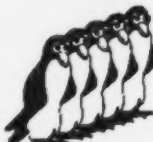
TEACHER LEVELS OF TRANSFER	
Ollie the Head-in-the-sand Ostrich OVERLOOKS  Does nothing; unaware of relevance and misses appropriate applications; overlooks intentionally. (persists) <i>"Great session but this wouldn't work with my kids or content" ... "I chose not to... because..."</i>	Dan the Drilling Woodpecker DUPLICATES  Drills and practices exactly as presented; Drill! Drill! Then stops; uses as an activity rather than as a strategy, duplicates. (observes) <i>"Could I have a copy of that transparency?"</i>
Laura the Look-alike Penguin REPLICATES  Tailors to kids and content, but applies in similar content; all look-alike, does not transfer into new situation; replicates. (differentiates) <i>"I use the web for every character analysis."</i>	Jonathan Livingston Seagull INTEGRATES  Raised consciousness; acute awareness; deliberate refinement; integrates subtly with existing repertoire. (combines) <i>"I haven't used any of your ideas, but I'm wording my questions carefully. I've always done this, but now I'm doing more of it."</i>
Cathy the Carrier Pigeon MAPS  Consciously transfers ideas to various situations, contents; carries strategy as part of available repertoire; maps. (associates) <i>"I'm using the webbing strategy for everything."</i>	Samantha the Soaring Eagle INNOVATES  Innovates; flies with an idea; takes it into action beyond the initial conception; creates, enhances, invents; takes risks. (diverges) <i>"You have changed my teaching forever. I can never go back to what I used to do. I know too much. I'm too excited."</i>

Figure 12 Teacher Transfer

STUDENT LEVELS OF TRANSFER	
Ollie the Head-in-the-sand Ostrich OVERLOOKS  Misses appropriate opportunity; overlooks; persists in former way. <i>"I get it right on the dittos, but I forget to use punctuation when I write an essay." (Doesn't connect appropriateness.)</i>	Dan the Drilling Woodpecker DUPLICATES  Performs the drill exactly as practiced; duplicates. <i>"Yours is not to question why—just invert and multiply." (When dividing fractions, has no understanding of what she or he is doing.)</i>
Laura the Look-alike Penguin REPLICATES  Tailors but applies only in similar situation; all look-alike; replicates. <i>"Paragraphing means I must have three 'indents' per page." (Tailors into own story or essay, but paragraphs inappropriately.)</i>	Jonathan Livingston Seagull INTEGRATES  Is aware; integrates; combines with other ideas and situations. <i>"I always try to guess (predict) what's going to happen next on T.V. shows." (Connects to prior knowledge and experience.)</i>
Cathy the Carrier Pigeon MAPS  Carries strategy to other content and situations. Associates and maps. <i>Parent-related story—"Tina suggested we brainstorm about our vacation ideas and rank them to help us decide." (Carries new skills into life situations.)</i>	Samantha the Soaring Eagle INNOVATES  Innovates; takes ideas beyond initial conception; risks; diverges. <i>"After studying flow charts for computer class student constructs a Rube Goldberg type invention." (Innovates; invents; diverges; goes beyond and creates novel.)</i>

Figure 13 Student Transfer

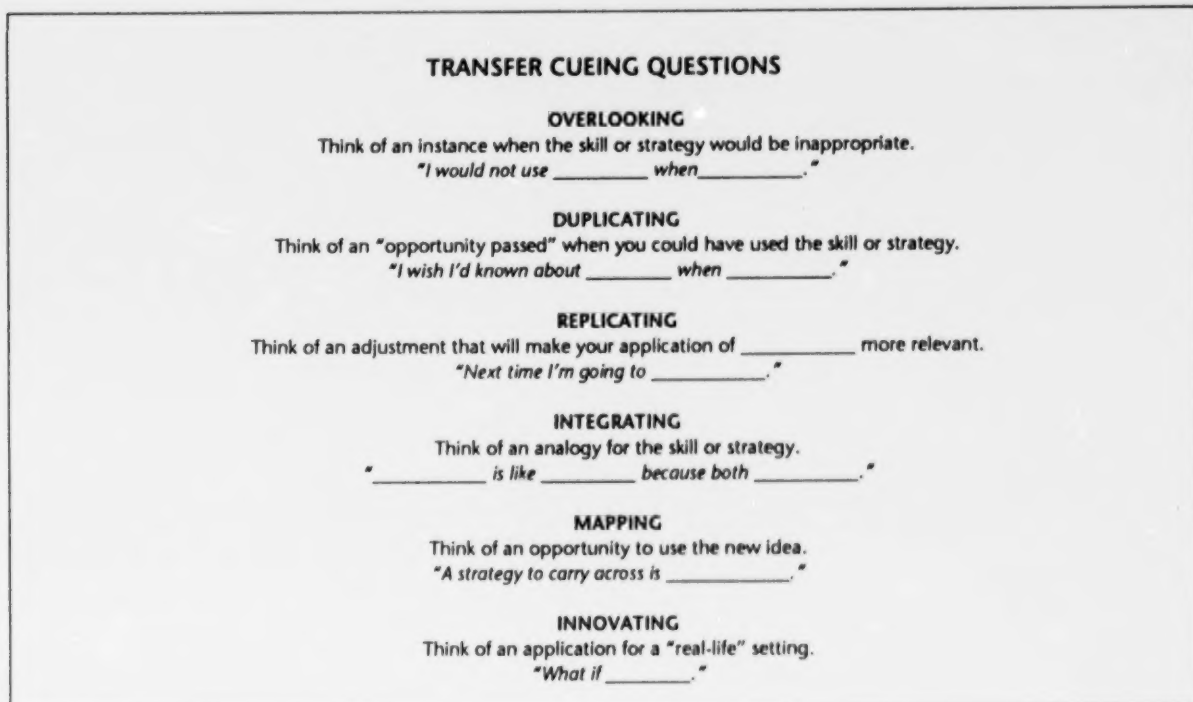


Figure 14 Transfer Cueing Questions

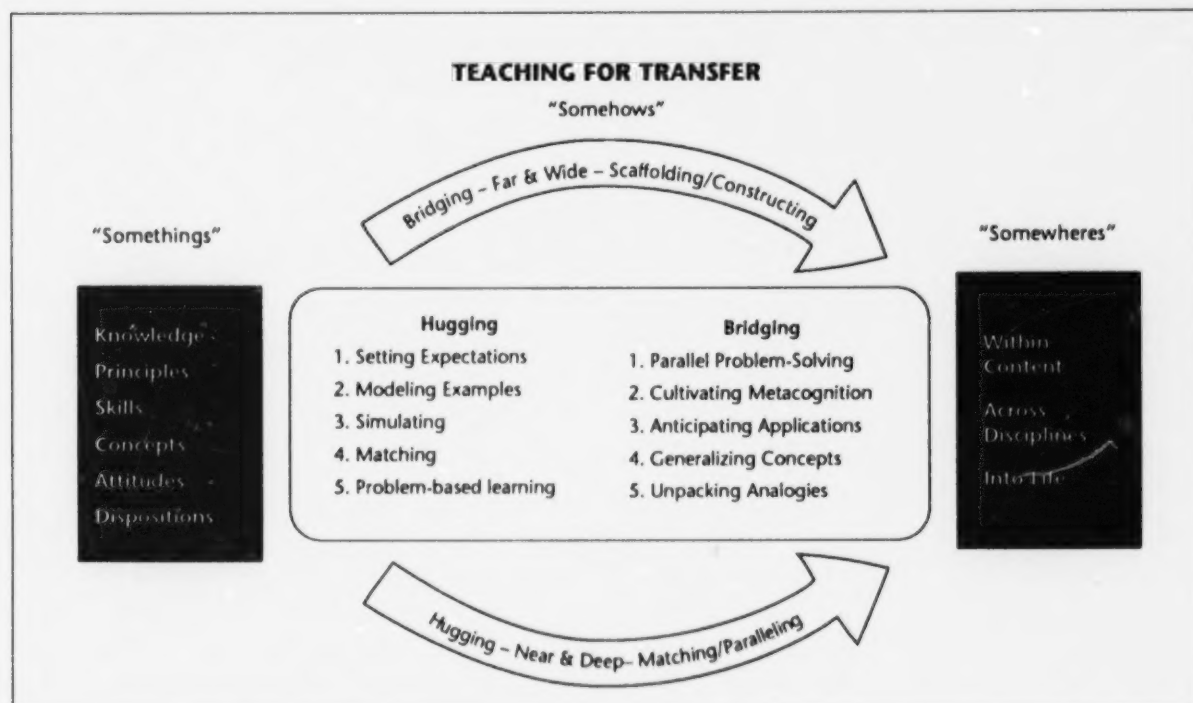


Figure 15 Somethings, Somehows, Somewheres of Transfer

REFERENCES

- Adams, M. et al. (1986). *Odyssey: A curriculum for thinking*. Watertown, MA: Mastery Education Corporation.
- Anderson, R., Hiebert, E., Scott, J., & Wilkinson, I. (1984). *Becoming a nation of readers: The report of the Commission on Reading*. Washington, DC: The National Institute of Education.
- Armbruster, B., & Anderson, T. (1980). *The effect of mapping on the free recall of expository text*. (Technical Report 160). Urbana Champaign: Center for the Study of Reading, University of Illinois.
- Ausubel, D. (1978). *Educational psychology: A cognitive view*. (2nd ed.). New York: Holt, Rinehart, & Winston.
- Bellanca, J. (1990). *Keep them thinking: Level III*. Palatine, IL: Skylight Publishing.
- Bellanca, J., and Fogarty, R. (1990). *Blueprints for thinking in the cooperative classroom*. Palatine, IL: Skylight.
- Bellanca, J., & Fogarty, R. (1986). *Catch them thinking: A handbook of classroom strategies*. Palatine, IL: Skylight Publishing.
- Beyer, B. K. (1987). *Practical strategies for the teaching of thinking*. Boston: Allyn & Bacon.
- Black, H., & Black, S. (1987). *Building thinking skills: Books 1-3*. Pacific Grove, CA: Midwest Publications.
- Brown, A. L. (1978). Knowing when, where, and how to remember: A problem of metacognition. In R. Glaser (Ed.), *Advances in instruction psychology* (1). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Brown, A., & Campione, J. (1990). Communities of learning and thinking, or a context by any other name. *Human Development*, 21, 108-125.
- Costa, A. (Ed.). (1985a). *Developing minds*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Costa, A. (1985b). *Teaching for intelligent behavior: A course syllabus*. Orangevale, CA: Search Models Unlimited.
- Crabbe, A. B. (1989). The future problem solving program. *Educational Leadership*, 47(1), 27-29.
- Dansereau, E., et al. (1979). Development and evaluation of a learning strategy training program. *Journal of Educational Psychology*, 71(1), 64-73.
- Davidson, J. (1982, October). The group mapping activity for instruction in reading and thinking. *Journal of Reading*, pp. 53-56.
- de Bono, E. (1973). *Lateral thinking: Creativity step by step*. New York: Harper & Row.
- de Bono, E. (1970). *Lateral thinking*. New York: Harper and Row.
- Edmonds, R. (1979). Effective schools for the urban poor. *Educational Leadership*, 37(1), 15-18.
- Feuerstein, R. (1980). *Instrumental enrichment*. Baltimore: University Park Press.
- Fogarty, R. (1990). *Keep them thinking: Level II*. Palatine, IL: Skylight Publishing.
- Fogarty, R. (1989). *From training to transfer: The role of creativity in the adult learner*. Doctoral dissertation, Loyola University of Chicago.
- Fogarty, R., & Bellanca, J. (1989). *Patterns for thinking: Patterns for transfer*. Palatine, IL: Skylight Publishing.
- Fogarty, R., & Bellanca, J. (1986). *Teach them thinking*. Palatine, IL: Skylight Publishing.
- Fogarty, R., & Opeka, K. (1988). *Start them thinking*. Palatine, IL: Skylight Publishing.
- Fogarty, R., Perkins, D., & Barell, J. (1991). *How to teach for transfer*. Palatine, IL: Skylight Publishing.
- Gordon, W. J. (1961). *Synectics: The development of creative capacity*. New York: Harper & Row.
- Hansen, J., Silver, H., & Strong, R. (1986). *Thoughtful education training series*. Moorestown, NJ: Hansen, Silver, Strong & Associates, Inc.
- Harvard University. (1983, October). *Project intelligence: The development of procedures to enhance thinking skills*. Final report. Submitted to the Minister for the Development of Human Intelligence, Republic of Venezuela.
- Hunter, M. (1973). *Teach for transfer*. El Segundo, CA: Tip Publications.
- Jones, B., Tinzmann, M., & Thelan, J. (1990). *Breakthroughs: Strategy for thinking* (series). Columbus, OH: Zaner-Bloser.

- Joyce, B., & Showers, B. (1983). *Power in staff development through research and training*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Joyce, B., Showers, B., & Rolheiser-Bennett, C. (1987, October). Staff development and student learning: A synthesis of research and models of teaching. *Educational Leadership*, 45, 17.
- Joyce, B., & Weil, M. (1985). *Models of learning*. Englewood Cliffs, NJ: Prentice-Hall.
- Lipman, M., Sharp, A., & Oscanyan, R. (1980). *Philosophy in the classroom* (2nd ed.). Philadelphia: Temple University Press.
- Lyman, F., & McTighe, J. (1988, April). Cueing thinking in the classroom: The promise of theory-embedded tools. *Educational Leadership*, 45 (7).
- Marzano, R., & Arredondo, D. (1986). Restructuring schools through the teaching of thinking skills. *Educational Leadership*, 43(8), 23.
- Marzano, R., Brandt, R., Hughes, C., Jones, B., Presseisen, B., Rankin, S., & Suhor, C. (1987). *Dimensions of thinking: A framework for curriculum and instruction*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Meeker, M. N. (1969). *The structure of intellect: Its interpretation and uses*. Columbus, OH: Charles E. Merrill.
- Opeka, K. (1990). *Keep them thinking: Level I*. Palatine, IL: Skylight Publishing.
- Parnes, S. (1975). *Aha! Insights into creative behavior*. Buffalo, NY: D.O.K.
- Parnes, S. (1972). *Creativity: Unlocking human potential*. Buffalo, NY: D.O.K.
- Perkins, D. N. (1986). *Knowledge as design*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Perkins, D. N., & Salomon, G. (1988). Teaching for transfer. *Educational Leadership*, 46(1), 22-32.
- Perkins, D. N., Mirman, J., Tishman, S., & Goodrich, H. (1991). *Connections: A program for integrating the teaching of thinking with instruction in the subject matters*. Unpublished material prepared by Project Zero, Harvard Graduate School of Education, Cambridge, MA, in conjunction with the Regional Lab of the Northeast and Islands, Andover, MA.
- Pogrow, S. (1990). *HOTS: A validated thinking skills approach to using computers with at-risk students*. New York: Scholastic, Inc.
- Sternberg, R. (1984). How can we teach intelligence? *Educational Leadership*, 42(1), 38-48.
- Swartz, R. J., & Perkins, D. N. (1989). *Teaching thinking: Issues and approaches*. Pacific Grove, CA: Midwest Publications.
- Torrance, E. P. (1978). Giftedness in solving future problems. *Journal of Creative Behavior*, 12, 75-86.
- Upton, R. (1985). *Strategic reasoning*. Bloomington, IN: Innovative Sciences, Inc.
- Vaughn, L. (1982, February). Use the construct procedure to foster active reading and learning. *Journal of Reading*.
- Wales, C., Nardi, A., & Stager, R. (1987). *Thinking skills: Making a choice*. Morgantown: West Virginia University Center for Guided Design.
- Whimbey, A. (1975). *Intelligence can be taught*. New York: E. P. Dutton.
- Will, H. (1991). The junior great books program of interpretive reading and discussion. In A. Costa (Ed.), *Developing minds: Programs for teaching thinking* (rev. ed., Vol. 2, pp. 57-58). Alexandria, VA: Association for Supervision and Curriculum Development.
- Winocur, S. (1983). *Project impact*. Costa Mesa, CA: Orange County School District.
- Witrock, M. (1967). Replacement and nonreplacement strategies in children's problem solving. *Journal of Educational Psychology*, 58(2), 69-74.

THE ART OF STRATEGIC CONNECTIONS

Faye Brownlie

As teachers build their classroom inquiry around their students, they weave curriculum content carefully together with processes that invite students to construct meaning.

—Brownlie, Close, & Wingren, 1990

Thinking—its diversity in representation and its inherent complexity and apparent simplicity—permeates what we do in school. Thinking bridges the experiences of the students to the written curriculum. Strategies are essential links in thinking of and with our curriculum and in making learning more accessible to more students. In this chapter, I will build a shared view of how strategies can be connectors strengthening the personal scaffolding of a thoughtful curriculum. Strategies can be applied in all subject areas and work for all students, from novice to apprentice to master teacher. Strategies, as described here, are initially teacher-directed, but they enjoy the full realization of their utility when adopted by the students and used independently as learning strategies.

Each subtopic in this chapter will be developed around a different prereading framework. These frameworks link prior knowledge, focus reader/

writer interaction, and exemplify thinking in practice.

ATTRIBUTES OF A THOUGHTFUL CLASSROOM

Teachers today are inviting students to become members of a club—a thinking club in which members are active, constructive makers of meaning. Together in classrooms, working as master builder and apprentice, teachers and students build understanding. There are always many possible right answers. What is crucial in establishing the rightness of an answer is the speaker's ability to explain his connections or his thinking to make explicit to the audience the way in which he has chosen to use bits of information to create an understanding. Differences in thinking are prized in such thinking clubs. Indeed, it is often these differences that enrich learning if minds are open to hear the surprises of another's thinking. This openness demands a respectful tone in a classroom, and a willingness on the part of all students and teachers to both participate in the construction and to hear and value one another's ideas.

Thinking classrooms are those in which inquiry is valued. Students frequently pose their own questions and learn to carry around in their back pockets those questions whose answers must develop over extended periods of time: "How can I be a faster racer?" "How can we prevent world hunger?" The uncertainty of the unknown is not viewed as an impediment to learning but rather as a challenge for future learning. It is essential to recognize that when we stop asking questions, we stop thinking.

In thoughtful classrooms, students learn how to question and how to search. Strategies and processes for the "how tos" of learning help them become increasingly more independent as questioners and as searchers.

Thoughtful learning also involves reflecting on what has been learned and how it has been learned. Students become aware of their ever-changing knowledge structures, which extend or regroup to fit new information. Students also become aware of how these patterns change with varying contexts and content. This personal reflection on content and process enables students to gain control over their thinking and to monitor and adjust their thinking as the need arises.

Teachers in thoughtful classrooms believe that all students can think, that learning is thinking, that we can all learn to think better, that interaction is fundamental to developing thought, and that teaching and learning in thoughtful classrooms is fun! They arrange for whole-group, small-collaborative-group, and individual experiences during learning sequences. They provide whatever support is necessary for learning to occur, encourage risk taking, and weave a community of learners. Indeed, it is this community of learners that drives the learning experience. Learning now fits the students, who are no longer force-fitted into a pre-determined system.

In thoughtful classrooms, the dominant sound is not that of the teacher's voice. Teachers aim to increase the talk time for their students. Students are encouraged to talk with one another as well as with the teacher. The language of recitation is replaced with the language of inquiry and real conversation.

Finally, thoughtful classrooms choose content that is worth knowing. Challenge is implicit in the activities designed to promote interaction with this content. Although the content may be common to all, learners are provided with choice in representation of understanding, in strategies, in timing, in independent versus partner work, or in content within a theme. Students of all ages understand what they are doing and why they are doing it. Teachers also help learners connect the content to their prior knowledge and use it for future inquiry and for wise action.

ATTRIBUTES OF A STRATEGY

When teachers are changing their instructional practices in classrooms and beginning to use more teaching/learning strategies with their students, the change follows a pattern. Change first takes place when teachers get new things to do. In this case, the 'new things' are a set of strategies. As teachers work at extending their strategic repertoires, differences in their students' learning become more obvious. These differences alert them to the possibilities of making more informed choices about the strategies they use; fitting strategies to the goals of their instruction and to student needs; and matching 'how' and 'what' questions more frequently. This is a philosophical shift for many teachers, a shift from teacher as technician to teacher as decision maker. It is also the shift that marks the difference between providing teacher-proof material and material for teaching.

To help teachers make the shift, a strategy such as "Think of a Time" in teacher study groups is very useful. "Think of a Time" is an exercise focusing on the attributes of strategies and on the sophistication of the choice involved each time a teacher selects a strategy to facilitate thinking and learning. By constructing an attribute list together, teachers learn a strategy to use with their students through participation, reflection, and the construction of a personal set of questions or criteria to guide future practice. Questions such as, "How is what I am currently doing in my classroom meeting our learning goals?" can be a frame for change. (See Figure 1.)

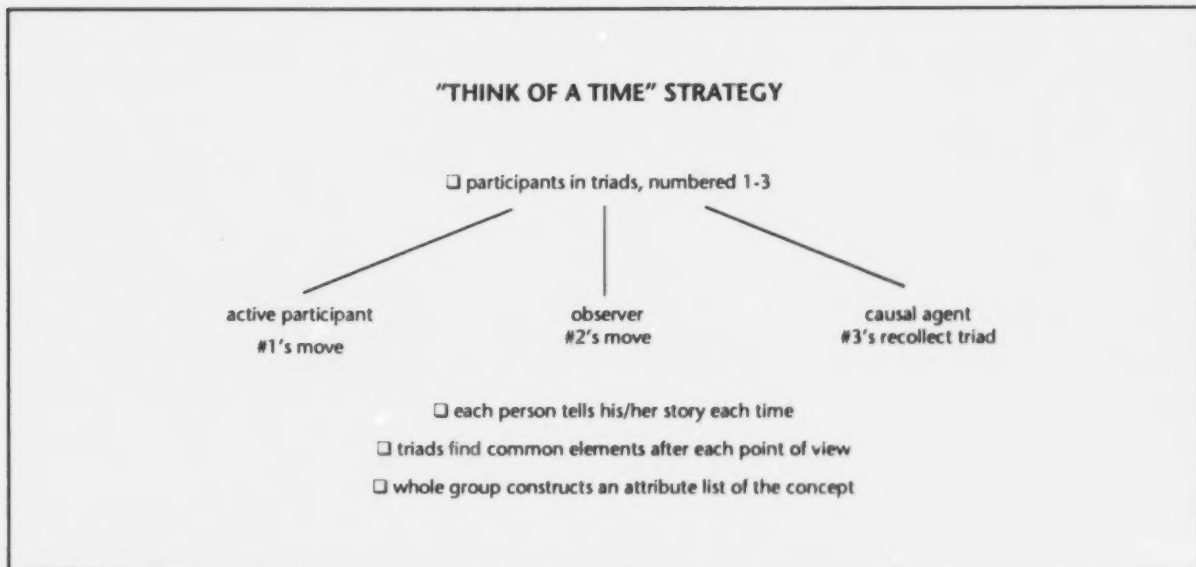


Figure 1 "Think of Time" Strategy

THE SCENARIO:**Imagine a Teacher Workshop**

Form groups of three and number yourselves from 1 to 3. We are going to consider the concept of teaching/learning strategies from three points of view: as active participants, as observers, as causal agents. Each member of the triad tells the story of a past teaching experience. After each point of view has been given in your triad, you will consider common elements of the stories you have told. Finally, we will construct an attribute list of strategies that we can personally apply in our classes.

Think of a time when you *personally used* a teaching/learning strategy. In your triad, each tell your story. In your learning logs, identify two or three common elements or attributes of the strategy used in each of your stories.

Number ones rise, say goodbye, and find a new group. This time, think of a time when you *observed someone using* a teaching/learning strategy. In your new triad, each tell your story.

Then, in your learning logs, compare and add to your strategy attribute list. Notice how your thinking is sculpted as you change your point of view and as you move from group to group. Number twos stand, say goodbye, and find a new group. Now

think of a time when you *helped someone use* a teaching/learning strategy. Tell your stories.

How much are you learning about the people you are talking with? Think of how such learning would impact on the social networks of your classroom. Please reflect one more time on the common elements of a strategy. Number threes, call your initial group home.

Now that you are back in your original groups, compare notes on your attribute list and be prepared to help us construct a shared list. Consider which of the elements you have listed are critically important to making a strategy work. Talk about this for a moment in your triads, then we will work as a whole group.

The following list has been compiled after using "Think of a Time" with six different groups of primary and secondary school teachers.

A strategy:

- *is constructive.* A strategy is a vehicle to build understanding. Students use personal understanding, extend this to connect with their small group, and finally extend their understanding to connect with the whole class. Information becomes personally owned and reuseable in different situations.

CREATING THE THOUGHTFUL CLASSROOM

- *values individuals.* All students can participate in a learning strategy, linking their personal experience to new information. Diversity is honored.
- *is supportive of risk taking.* A strategy helps build a climate of mutual respect and trust. Students are encouraged to be open to others' ways of thinking.
- *focuses on the development of social skills.* Participants move within a strategy from individual to collaborative groups to class organizations. No one works entirely alone or always in a group. The power of learning together, followed by individual applications of the learning is emphasized.
- *includes reflection and feedback.* Teachers and students examine, alone and together, the impact of the use of the strategy on learning.
- *is adaptable and transferable.* The pattern in any specific strategy is not fixed. Strategies adapt and change with purpose and with the growing expertise of the participants. Any strategy should be useable in many different contexts and contents.
- *strengthens with practice.* A strategy improves as a learning tool as learners become more competent with its use.
- *encourages independence.* A strategy is ultimately useful if learners can integrate the thinking behind the strategy into their own repertoires, and make use of it in other learning situations.

This strategy, "Think of a Time," is readily transferable. Together with a group of teachers, a teacher leader or an administrator could construct the group's attribute list. Then teachers can use this list to focus their reflections on the strategic learning opportunities available in their classrooms. The following questions are examples of those used in encouraging teacher reflection:

- What am I currently feeling very successful about in strategic learning?
- What is my evidence for this success?
- What does this strategy look like and sound like in my classroom?

- What is challenging for me in my teaching?
- How can I tell when I am making progress on this challenge?
- What kind of support do I need?

When teachers begin reflecting on their own practice, education begins to lead out from within.

STRATEGIC PLANNING

When working with teaching/learning strategies, ultimately the goal is to move the students toward independent application of the thinking behind the strategy. With this goal in mind, teachers explain their thinking to the students, modeling the choices available and the decisions made in choosing a particular strategy. Such modeling enables the students to use these considerations later to help make their own informed decisions about learning when the teacher is not there to guide them. The teacher thus explains the why of the strategy (what is the purpose? what do we hope to achieve?) and the how (the steps, a preview of what is going to happen, an advance framework to enable students to construct a "big picture"). (See Figure 2.)

The reasoning behind a strategy requires explicit instruction. Thus, the teacher teaches the strategy in context with the whole class, then reflects with the students on what they did and why. This can be risky for teachers, especially as this "sharing of all the cards" with the students may be new to them. We often do not feel comfortable when students give feedback on our teaching, even if it is constructive. Sometimes we have not reflected ourselves on reasons for the lesson design, or may be so used to choosing strategies that match our learning style that we unintentionally overlook those students who process information more easily in another style.

It is not our intent to focus only on students' preferred ways of thinking. The challenge is to build up an acknowledged student repertoire. Thus, it is critically important that we listen carefully to the students at this phase, helping them understand our choices and helping them recognize which parts of the learning sequence were most functional and applicable for

STRATEGIC PLANNING

SETTING THE STAGE

1. Identify the strategy to be taught.
2. Discuss the reasons why it is being taught.
3. Tell the steps of the strategy.

GUIDED PRACTICE

7. Review the steps of the strategy with the students.
8. Establish criteria for effective use of the strategy.
9. Use the strategy in a variety of contexts and with a variety of texts.
10. Reflect with your students on their growing competency with the strategy.

MODELING AND DIRECT INSTRUCTION

4. Teach the strategy in an appropriate context.
5. Provide opportunities for whole-group work, collaborative-group work, and individual work.
6. Reflect with your students on what you did and why.

ENCOURAGING INDEPENDENT APPLICATION

11. Provide opportunities for students to use the strategy independently in materials of their own choosing.
12. Encourage adaptation of the strategy to fit text, context, and personal style.
13. Monitor the student's expertise and independent application of the strategy.
14. Monitor the gradual diminishment of teacher support needed.

From *Tomorrow's Classroom Today* by F. Brownlie, S. Close, & L. Wingren: Pembroke, 1990. Reprinted with permission.

Figure 2 Strategic Planning

them. Such feedback empowers individual learners, and extends and refines a strategy beyond a recipe stage. When students consider the purpose of an activity within a classroom, they become more involved with meaningful issues and thus more motivated to participate and learn. This is a strong move away from things being done to students in classrooms, to events being planned with students in classrooms.

The effective use of strategies in classrooms takes time to develop. Working through a checklist of strategies, trying each one or two times, does not extend thinking across the curriculum or impact significantly on student learning. Effective change in thinking requires using a few strategies in a variety of contexts and with a variety of texts or contents over time. Students work with teachers to establish criteria for effective use of the strategy and monitor their use of this strategy and their subsequent learning. Some of my most effective staff development programs have focused on using six new strategies in one year, refining them to the stage where a teacher automatically can take a learning goal, consider the students involved, con-

sider the resources available, and apply the most appropriate strategy or strategy sequence.

The decision making involved in using strategies is fully realized when it is transferred to the students. Our goal is to support them in becoming independent learners. They need opportunities to apply the strategies themselves in materials and situations of their own choosing. They need not adopt our strategies, but they do need to adapt and refine them to suit their learning purposes and styles. Over time, with students of all ages, the amount of teacher support required in a strategic sequence will diminish. Students, too, will be able to choose a strategy that best fits their learning purposes from their own repertoires. Thus, both the content of the curriculum and the thinking processes of the curriculum are being personalized and learned. It is this "how to" of the processes that enables students to become lifelong learners.

Monitoring the Strategies We Teach

Perhaps the most unfamiliar element in the process of implementing strategic connections in

classrooms is the need to develop some practices for monitoring the effective use of the strategies. Reflection on and about practice is new to many of us.

The development of criteria for success is key in monitoring our development. Sometimes we use criteria from the outside. In this case, teachers could use the attributes of a strategy that we developed in teacher study groups. These attributes can be applied as personal frameworks for monitoring and enhancing our growth. Questions we use to guide our application of this framework include:

- Who is the audience?
- What is the purpose?
- What is the form?
- How do I tell if we are getting better at it?
- What are my criteria for success?
- Which elements of this strategy are clearly evident in my classroom—choice, active learning, practice, modeling of thinking?
- What do I need to do more of, more often?
- Which of these strategies most supports the thinking of my students?
- Have I provided ample opportunity for whole-group practice of the strategy and for individual choice in using the strategy?

Even more powerful is developing with your students, or with a colleague or a group of colleagues, your own list of attributes. This list then becomes a more relevant framework for monitoring and enhancing strategic growth. The more students know about the overarching classroom goals, the more easily and expertly they participate with you in evaluating the use of strategies to facilitate their learning.

Some teachers have been using Howard Gardner's theory of multiple intelligences as their framework for monitoring teaching/learning strategies in the classroom. A form, such as the one in Figure 3a, is completed at a natural break, such as the end of a day or the end of several classes. Some teachers choose to complete this independently; some choose to complete it with their students. Of course, the importance of completing a form such as this is that it enables us to reflect on our past decisions as teachers and to fuel wise action. If we

find we are spending an inordinate amount of instructional time around a cluster of intelligences, then the form should prompt us to consider a different strategic sequence that addresses several intelligences.

Some teachers have also used a form such as the one in Figure 3b to track the focus strategies they teach and the opportunities they provide students for independent application of the strategy.

Students Monitoring the Strategies They Use

The ultimate goal in teaching is to enable students to become independent, lifelong learners. Teachers must involve students in reflection on their thinking and on the use of strategies to help them think. The following student samples were collected from three different grade groups, each using the same strategy: "Listen—Sketch—Draft" (Brownlie, Close, & Wingren, 1990).

In a grade two/three class, the students were very used to reflecting on their thinking and to being actively involved in examining their learning. When a relief teacher came to their class, she asked them what they noticed about their thinking. Brent explained his drawing: "My ideas came from listening to the story, mixing that up in my brain, and remembering what I needed by drawing pictures." What he noticed about the story was "My think is nobodys perfect," an apt summary, considering the story he had heard was about an old lady who had lost her memory. When asked how the strategy had helped, he said, "it encrises [increases] your thinking." (See Figure 4.) Tricia understands that a thoughtful response to reading is moving beyond the story to personalize the meaning. (See Figure 5.)

Although this strategy was new to the students, they have ably applied their personal knowledge about how thinking works in reflecting on their use of the new strategy. Their representations show a developing understanding of how to connect stories to their lives.

These responses are from a grade three/four class:

I want to write to people. Not talking would make me think better. I was thinking about what I would do if I was a writer.

MONITORING MULTIPLE INTELLIGENCE STRATEGIES	
Date: _____	Name/Class: _____
Record each time you practice or I teach using a different intelligence. Let's try to give examples.	
Linguistic: _____	
Visual: _____	
Logical/Mathematical: _____	
Body/Kinesthetic: _____	
Musical/Rhythmical: _____	
Interpersonal: _____	
Intrapersonal: _____	
*Did you have a preference for any intelligence or any combination? _____ _____	
*Were you surprised by any aspect of this record? _____ _____	
*What is your plan to expand your thinking? _____ _____	

Figure 3a Monitoring Strategies Via Gardner's Intelligences

TRACKING FOCUS STRATEGIES			
Name: _____		Date: _____	
Date/ Month	Strategy	Shared Selection	Independent Application
September			
October			
November			
December			
January			
February			
March			
April			
May			
June			

From *Reading and Responding: Evaluation Resources for Your Classroom (Grade 4)* by S. Jeraski, F. Brownlie, and L. Kaser: Nelson Canada, 1990. Reprinted with permission.

Figure 3b Teacher's Record

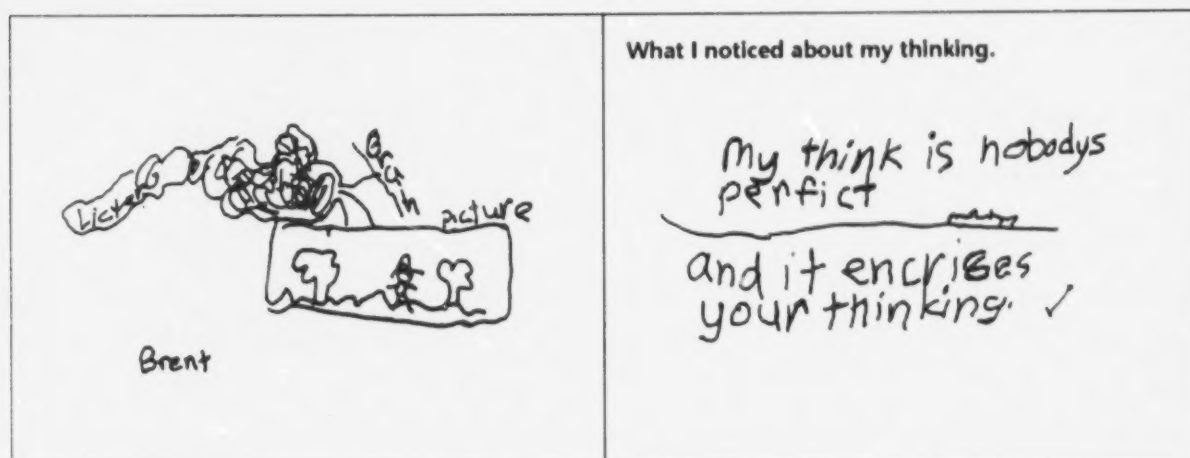


Figure 4 Brent's Drawing

*I was thinking about the story and if it was true.
I think it's good but it's nicer to draw good colour
pictures.*

*Neks time it mite be eseyr. The picjer was
esey. [Next time it might be easier. The picture
was easy.]*

The students have linked their thinking to real world purposes—writing and truth. They acknowledge the challenge and give advice for color pictures and more practice to make it easier. Their ability to articulate these thoughts enhances their monitoring of their necessary conditions for learning.

Finally, these reflections with the same strategy, are from a grade nine class:

*When other people are talking I notice that I can
put all of my effort to remembering or imagining, but
when I read fifty percent goes to reading and fifty
percent to imagining which means I don't remember
as well; if its a good story, but if its dull my mind
wanders.*

Jamie is definitely a social learner!

What I noticed about my thinking.

My think is nobodys
perfict

and it encribes
your thinking. ✓

*I notice about my thinking that when someone is
reading to me, I make up pictures about it in my
head which often pertain to my life.*

Stephen acknowledges both the images he uses in listening and the personal connections he makes as he extends beyond the text.

*My thinking gets side-tracked to what the tape or
the people are saying. My thoughts get mixed up
and unclear before getting into the story.*

For Sabrina, making meaning requires some time and distance.

It is evident from the student samples that they are internalizing what is valued in the classroom. As they reflect on their thinking and their use of strategies, teachers use the information to monitor their students' developing independence and to provide appropriate instructional support.

To close, see Figure 6, Alanna's poem reflecting on her thinking and learning at the end of her first full year of school. Alanna is definitely uncovering the mysteries of lifelong learning!

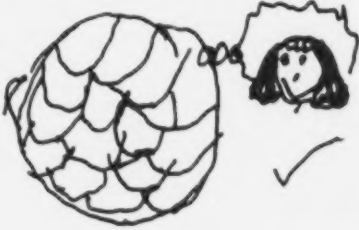
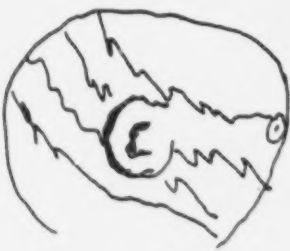
 Michelle	What I noticed about my thinking. that I was bilong My thinking up
 Jennifer	What I noticed about my thinking. My dran was geting good Acheg in my head ✓
 Tricia	What I noticed about my thinking. I was thinking about the story and I icpandr

Figure 5 Michelle, Jennifer, Tricia

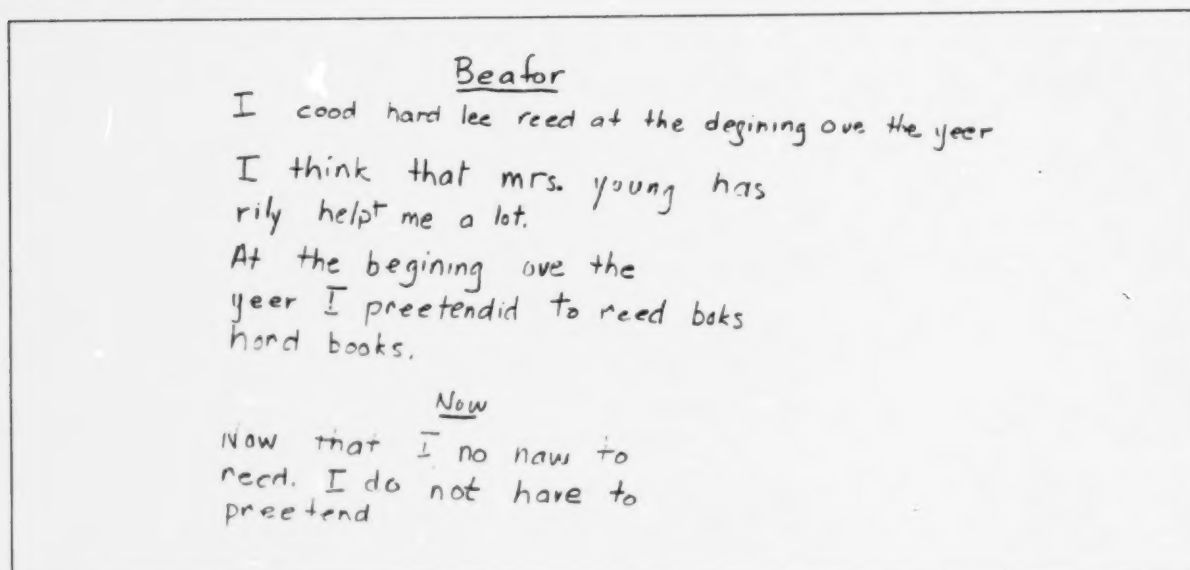


Figure 6 Alanna's Poem

REFERENCES

- Brown, R. (1991). *Schools of thought*. San Francisco: Jossey-Bass.
- Brownlie, F., Close, S., & Wingren, L. (1990). *Tomorrow's classroom today: Strategies for creating active readers, writers, and thinkers*. Portsmouth, NH: Heinemann and Makham, Ontario: Pembroke.
- Brownlie, F., Close, S., & Wingren, L. (1988). *Reaching for higher thought: Reading, writing, thinking strategies*. Edmonton, AL: Arnold Publishing.
- D'Arcy, P. (1989). *Making sense, shaping meaning: Writing in the context of a capacity-based approach to learning*. Portsmouth, NH: Boynton/Cook Publishers.
- Eisner, E. (1991). *The enlightened eye*. New York: Macmillan.
- Gardner, H. (1983). *Frames of mind: The theory of multiple intelligence*. New York: Basic Books.
- Jeroski, S., Brownlie, F., & Kaser, L. (1990). *Reading and responding: Evaluation resources for your classroom*. (Three volumes: Grades 4, 5, & 6). Toronto, ON: Nelson, Canada. (Available in the U.S. from The Wright Group, Bothel, WA).
- Jeroski, S., Brownlie, F., & Kaser, L. (1991). *Reading and responding: Evaluation resources for your classroom*. (Two volumes: Late primary and Primary). Toronto, ON: Nelson Canada. (Available in the U.S. from The Wright Group, Bothel, WA).
- Ministry of Education. (1991). *Thinking in the classroom: Resources for teachers*. Victoria, BC: Ministry of Education.
- Smith, F. (1991). *To think*. Columbia, New York: Teachers College Press.

CREATING THE THOUGHTFUL CLASSROOM

Jean Speer Cameron

Today's classroom in which children are not challenged to be thinkers looks very much like the classroom in which those who are attempting to restructure education spent their school years. The room is organized with five rows of desks, six desks in each row. The teacher's desk is usually located in the front of the room. In another area of the room, a cluster of small chairs is grouped around an adult chair. A rug is on the floor in another area. A glance into the room would show the majority of the children sitting at their desks doing seat work while another small group of children gathers around the teacher for a twenty-minute reading lesson. Except for the sound of a child reading to the teacher, the room is quiet. Occasionally, a child leaves the row of seats to sharpen a pencil or to put the appropriate card in the washroom slot. The activities in the room are controlled by the teacher, and the children comply with expectations. Learning is occurring, but with little involvement by the children and much control by the teacher.

The classroom in which children are challenged to be thinkers and learners has a different appearance. The furniture is in a flexible arrangement so

it can be rearranged to support a variety of class activities. Sometimes the desks are in rows, but more often they are grouped by pairs or are in groups of four or five. The teacher's desk is tucked away in a corner. Most of the instruction is directed to the entire class, reducing the need for seat work while the teacher works with a small group of children. On the chalkboard is a web representing the brainstorming the children participated in to develop ideas for writing a story. The physical space of the classroom is enriched by a multitude of student-generated projects attached to the walls, ceiling, windows, and any other available spaces. There is a hum of activity as children read to each other and share stories they have written. A casual observer might have difficulty locating the teacher, who has joined the children working in the science corner.

Teachers whose classrooms look like the first one are often well-trained in management skills. They are respected by their peers, parents, and administrators for directing children through the objectives of the curriculum. The children are not unhappy in these classrooms when the teacher is a caring, nurturing individual. However, a lesson

that these children learn early is that those who are most successful in school are those who comply with the rules, work quietly, complete what is asked of them, and learn the facts that are taught to them. School is not a place to question, analyze, create, synthesize, or evaluate. This traditional classroom, with its emphasis on compliance, no longer prepares children to be productive citizens in the global, technological society of the twenty-first century. Today's children live in a world in which the information explosion requires that citizens learn how to manage information, not memorize facts. To manage information, children need to learn not only content, but also processing skills and how to work in a cooperative, teaming approach.

To create the necessary changes in which instruction is delivered requires a systematic process. Michael Fullan suggested a model for change in a 1989 presentation to the Illinois Association for Supervision and Curriculum Development Fall Conference. It provided direction for a public school district in Illinois that was attempting a major change. Fullan's model of change included three separate phases—initiation, implementation, and institutionalization. The initiation phase involves those events that lead up to and include a decision to proceed with a change. The first experiences of putting the idea into practice are the implementation phase. Institutionalization has to do with whether or not the change becomes an ongoing part of the system. Within each of the three phases Fullan described a set of success factors.

Fullan's model provided the guidelines needed for the change process that had just begun in Elmhurst Community District 205 in Elmhurst, Illinois. District 205 includes grades kindergarten through twelve, with a teaching staff of approximately 400 and a student enrollment of 6,000. Prior to the initiation of a thinking skills program in the district, instruction in many classrooms was similar to the traditional classroom described above. Through reading articles in educational journals and participating in professional growth activities, some teachers had become aware of the thinking skills movement. Other teachers had developed, through their own experiences, a style of teaching that valued students as thinkers.

INITIATE INNOVATION – PHASE I

In the initiation stage Fullan described the change success factors as:

- a linking of the change to a high-profile need,
- a clear model of procedures for implementation,
- a strong advocate who provides both pressure and support, and
- an active, short start-up period.

Link Change to High-Profile Need

The development of a high-profile need for change across the district was created when—through the efforts of the central office administration—the following instructional goal was adopted for the district:

To improve student achievement through a focus on the instructional, classroom management, and communication skills that foster cognitive instruction and higher-level thinking.

A task of the change agent in the initiation stage is to create the high-profile need. Thinking skills were not perceived by most staff in District 205 as a high-profile need prior to the writing of the district instructional goal. That perception changed as the goal shifted to the building and individual levels. Once an instructional goal has been approved by the Board of Education, principals work with their staff to incorporate the district goal into the building's goals and activities. For example, each teacher's professional goals are developed in collaboration with the supervisor to support building and district goals. This process provides the mechanism for bringing a high-profile need of thinking skills into the goals of the schools and the staff members.

Set Model for Change

Progress toward fulfilling an instructional goal on thinking requires a consideration of the current curriculum, the needs of the teacher, and the structure of the district. Though teachers say they value the teaching of thinking skills, often their first real concern is that there is not enough time in the school year to teach the current curriculum. An approach to the teaching of thinking that supports the curriculum and values the concerns of the

teacher is one more likely to be implemented. Fullan referred to Seymour Sarson's statement that educational change depends on what teachers do and think—it's as simple and as complex as that.

Though several models for thinking were reviewed for possible implementation, the one that seemed most appropriate for use in District 205 was one that focused on teaching strategies to enhance thinking within the curriculum, rather than adding to the already crowded curriculum. The teaching strategies in the adopted model were appropriate across grade levels and content areas, an important dimension in a K-12 district.

The training model focuses on four essential elements that promote thinking in the classroom—setting the climate for thinking, structuring interaction with thinking, teaching explicit skills of thinking, and using metacognitive processing about thinking. The training for teachers is organized to support transfer from the work session to the classroom. Since teachers provide the framework for a thinking classroom, they are asked to consider the following groups of questions (from Fogarty & Bellanca, 1989) as they adjust their instruction to promote thinking.

Setting the Climate for Thinking Setting a safe climate for thinking by modeling risk taking and acceptance.

- Does the room arrangement invite interaction, openness, flexibility?
- What verbal and nonverbal messages are you communicating?
- Are you modeling the teacher as a learner?
- Do you LISTEN?
- Do you energize and motivate?
- Do you tolerate the noise, movement, and failure that sometimes accompany a thinking environment?
- Do you set an atmosphere of expectancy and focus?
- Do you project high expectations?
- Do you treat students as thinkers?

Structuring Interaction with Thinking Getting students to process the information and interact with the material in experiential activities.

- Do you structure groups to accommodate various learning situations and learning styles?
- Do you model the teacher as a participant?
- Do you invite involvement through forced responses?
- Do you set clear rules and objectives for students to target?
- Do you assign roles and responsibilities to foster accountability and cooperative efforts?
- Do you listen, observe, and facilitate interaction to foster thinking in the classroom?

Teaching Explicit Skills of Thinking Teaching the thinking skill explicitly to students and bridging skill application into relevant situations.

- Do you teach the micro-skills of thinking explicitly?
- Do you define terms and post the objective?
- Do you vary the learning input to meet different learning styles and different rates of learning?
- Do you provide opportunities for students to process the material?
- Do you build in guided practice with monitoring and feedback?
- Do you value thinking enough to set time priorities to teach the skills?

Using Metacognitive Processing About Thinking Getting students to think about their thinking and deliberately bring their thinking patterns to a conscious level.

- Do you process learning activities with students?
- Do you help them track their thinking patterns by inviting them to verbalize how they did what they did?
- Do you lead them into metacognitive processing by providing time to reflect in writing about their thinking strategies?
- Do you help students make the connections between new learning and past experiences?
- Do you guide them to extend new learning with relevant situations both in and out of the classroom?

- Do you bridge learning to help students make the transfer?
- Do you provide visual formats and ask metacognitive questions?

Advocate Change

In the initiation phase of change, the vision and support of a strong advocate is an essential component. The change advocate in the District 205 process—to facilitate instruction that supports students as thinkers—came through the director of instruction, a position in the superintendent's cabinet. The superintendent had reorganized the central office responsibilities and created the Office of Instruction and Human Resource Development to connect the instructional needs of staff with appropriate professional growth activities. Though the instructional goal had been developed primarily by the director of instruction, the support of the superintendent and the Board of Education validated its importance to the district staff. The director of instruction was able to work with the staff development committee and other district administrators in the implementation of the goal.

Initiate Action

Though a multi-year plan was developed to initiate the goal, the first year of the plan began with a focus group of teachers and administrators from each of the district's twelve schools. Each of the schools in District 205 was expected to form a team of volunteer teachers and the building principal to participate in a series of workshops related to instructional strategies that enhance a thinking classroom. The four full-day workshops were scheduled in a classroom at one of the district's elementary schools, with the first workshop held in October and the last in May. Teams were expected to participate in all four sessions along with the superintendent and the director of instruction. The funding for the activity was obtained through the state staff development grant and covered the costs of the consultant, materials, and substitutes for teachers.

Since the first training is a pivotal one for the outcome of the project, the details for the first session had to be carefully planned. Twelve teams in District 205 began a project based on an instructional goal and an overview of a training package

that had been presented to them prior to volunteering for the project. The initial training session needed to capture their enthusiasm and provide them with a vision of how their participation could be a change model for instruction. Important factors to consider were the consultant's skills in establishing a climate that supported the adult learner as a thinker, the training materials and activities, the readiness level of the volunteers, the participants' affective needs as learners, and the wide range of skills represented by the learners. District 205 volunteers included teachers with tenure in the district and newer teachers.

In the first training session, the expectation was established that all participants, teachers *and* administrators, would be actively involved in the activities and would commit to using the strategies within their workplace prior to the next session. The expectation that change would occur as a result of the training was also a critical component of the beginning session. Each participant was asked to use several activities from the training and to bring back artifacts to share at the next training session. Transfer from training to the workplace was established as an expectation of participation.

During the first year of the training, enthusiasm for the implementation of the strategies presented during the District 205 workshops increased as team members shared their success stories with each other and with other teams. In each session, participants practiced a few skills in each of the four essential elements of the thinking classroom. They then used them with their students. They were excited about positive student reaction to paired partners and cooperative groups. They brought back to the training sessions samples of brainstorming, huge sheets of newsprint covered with webs. The teacher's new role in stressing student interaction with each other and the materials of learning was not always comfortable. But, in the training sessions, participants discussed their successes and received support when new strategies had not worked as planned.

Several factors of the thinking skills model and similar trainings increased participants' enthusiasm for a change project. The strategies teachers transferred into the classroom fit into their reper-

toire. They often were not new strategies but a validation of an approach already in use. Though the thinking skills strategies slowed down the delivery of curriculum, their use did not expand it. Of great importance to teachers, they often received support from students when attempting the strategies. Teachers were encouraged to continue working with the strategies when administrators incorporated the strategies into the activities that they directed. Administrators used the strategies in team and building meetings and administrator work sessions.

The last workshop training session with the consultant was used by each team to develop an action plan for the continued implementation of the instructional strategies at each building. These plans were used to refine the district instructional goal for the second year of the program.

IMPLEMENT INNOVATION – PHASE II

Change is a process that occurs over a period of extended time. The first year of training in the District 205 thinking program was the first step in a plan that has continued for six years. Fullan described several essential factors in the implementation of an innovation:

- orchestration of the network for change,
- empowerment of others to share in the problem solving and decision making,
- pressure and support in a delicate balance,
- training and coaching in the innovation, and
- reinforcement with early and frequent recognition and rewards.

The success of a program, as evidenced by transfer of instructional strategies in classrooms across a district, reflects attention to Fullan's implementation of innovation factors.

Orchestrate The Network

Inherent in the orchestration of an activity is a plan that includes a director and players, each with specific roles and responsibilities for creating the desired change. The orchestration plan in District 205 began with the training of the volunteer teams

at each building. These teams developed action plans for implementation, which differed somewhat from team to team. Some teams chose to meet periodically during the following year to discuss the strategies that they were using and to encourage each other. Others decided to select several of the strategies for a presentation to other staff members at their school. All teams defined the need to continue meeting in some format during the second year to move forward in using the strategies.

The focus from the district perspective was to create the network for change at several levels. At the building level, the teams were expected to continue using the instructional strategies during year two within their own classrooms. Additional volunteers were solicited from each building to participate in another four days of district training during year two.

Empower Others

Those who were involved in the first training were asked to assume the role of peer coach for the additional staff at their buildings participating in the second training. Prior to the second training, a review session was held for those previously trained at each building to discuss the strategies that would be presented in the workshops. This had two purposes. It served as a review of the strategies for the first group, and it provided them with a focus for sharing with the new teachers involved. Those beginning the training were asked to practice the instructional strategies presented and to invite teachers from the first training to visit their classrooms. This helped develop a dialogue related to the implementation of the skills.

Since the number of high school teachers in the first training for District 205 was smaller in proportion to the total number of teachers than at the elementary or junior highs, the high school principal requested that the training be provided for an expanded group of high school staff members. Each department chair was expected to participate in the training along with a volunteer member from each department. The high school principal and assistant principal made a commitment to participate in the workshops with the groups of teachers. Though the department chairs were re-

quired to attend, other staff members had the opportunity to volunteer. The high school workshops put stress on the substitute staff and the building facilities, but the consultant was able to work through these distractions.

Balance Pressure and Support

The delicate balance of pressure and support that Fullan described is essential in the implementation of change. In the second year of the training, support for the program was maintained at various levels. Across the entire district, principals and the teams who participated in the first training worked together to implement the strategies. Principals and trained staff members met before school to share ideas related to implementation of the strategies. They made presentations at faculty meetings for other staff members and shared materials from the training sessions. Support for District 205 teams also came from the continued district focus on their instructional goal, which incorporated teaching strategies related to climate setting, student interaction, explicit thinking skills, and metacognition. Scheduling the thinking skills consultant for more intense training workshops at the high school level validated the district's continued support. The training continued at the elementary and junior high schools though it was delivered by a district administrator.

Pressure was also placed on those who were involved in the first training to continue using the thinking strategies as peer coaches for those in the second training. Prior to the training sessions at the District 205 elementary and junior high schools, the district trainer met with the peer coaches to review the strategies that would be presented, to encourage sharing how they were using the strategies, and to brainstorm ways they could support those people beginning the training.

Throughout District 205 a variety of methods were used to maintain enthusiasm for the program. Building principals worked with their teams to find ways of sharing the thinking strategies through grade level, department, and building meetings. A teacher and principal who had been involved in the first year of training prepared a videotape for presentation to the Board of Education. It demon-

strated the strategies in a fourth grade class. A two-hour overview of the program was presented by the consultant for all teachers in the district as part of an institute day. Following the session, those who had previously participated in the training or who were currently involved in the training were invited to a special "reunion" session with the consultant.

At the conclusion of the first intense year of training at the high school, the principal required each department to select at least five of the thinking skills strategies to focus on during the next school year. Those who participated in the training were expected to share the strategies with others within the department and to demonstrate implementation of the skills. The high school plan for the third year included continued training from the program consultant, and it required all new staff members and volunteers from the tenure staff to participate.

Train and Coach

As teachers began to develop a level of expertise in the use of the thinking strategies, there emerged at the elementary level two who had reorganized the material into a succinct format that seemed to facilitate the use of the skills in their third and fifth grade classrooms. These two enthusiastic teachers were willing to present workshops to other elementary teachers. For the next three years, those who had not already participated in workshops at the elementary level and teachers new to the district worked with the district trainers in workshops. The training was consolidated into two half-day sessions scheduled over a month to allow for practice with the strategies between sessions. As previously, those at a building who had participated in earlier trainings were expected to serve as peer coaches for those in the current sessions. A trained teacher has paired with a teacher just beginning training in the building. They periodically met to share their use of strategies and to plan classroom visits to observe each other implementing the strategies with students.

At the high school level, a science teacher emerged as one who was able to implement the program very successfully in his classroom and who also had the skills to present the strategies to his

peers. After the initial years of training with the program consultant, the continuing training at the high school level was assumed by the science teacher, who used a format similar to the one developed for the elementary teachers.

Reinforce with Recognition and Rewards

Successful implementation of an innovation requires reinforcement with early and frequent recognition and rewards. Attention was given to this requirement at the building level and district level as the program was implemented. The teams at each building who participated in the first year of training were recognized as the experts and were expected to continue a leadership role as other teachers began using the skills. In each successive training session the new experts were added as building resources. Teachers were selected from the experts to continue the training workshops. Several networking sessions were scheduled across the district so those who had participated in the training could share the strategies they were using successfully and receive additional support to continue the thinking strategies focus. The consultant scheduled a reunion with teachers who had participated in the training. A financial incentive was developed by the district in order to reimburse the teachers who had emerged as trainers.

At the district level, recognition was given to participants through a presentation to the Board of Education. Teachers prepared a videotape demonstrating thinking strategies in the classroom. It was shown to the board and also used in subsequent training sessions. Slides were taken throughout the district, illustrating the application of thinking strategies in the classroom. This slide presentation was developed primarily for the board as an evaluation of the training to demonstrate there had been transfer from the workshops to instruction. It was also used in presentations for other educational agencies at the local and national levels.

Those who participated in the training originally have continued to receive recognition for their efforts. The teachers who emerged as trainers have participated in workshops at the national level and have enhanced their presentation skills. As they

have continued to train their peers, they have also contracted with other organizations to teach thinking skills. The district continues to receive inquiries and visits from other educators about the process used to implement the thinking skills program and the transfer of the training into the classrooms.

Validation from the board and the administration that the teachers who participated in the thinking skills program have made a significant impact on changes in classroom instruction provides reinforcement that supports continuation of the program. The early and frequent recognition and rewards were an important component in support of change.

INSTITUTIONALIZE INNOVATION—PHASE III

Even though the components for initiation and implementation of an innovation are followed, the continuation of a change requires that the innovation become institutionalized. Fullan suggested that for this to happen the innovation must be

- embedded both politically and economically as part of a system,
- linked to instruction and have widespread use, and
- provided with continuing assistance.

Since classroom instruction that facilitates thinking strategies depends on how teachers teach, specific attention must be given to an ongoing process that will maintain those strategies as district and building priorities.

Embed Innovation

In order to maintain a focus on thinking skills, District 205 had to develop a plan for embedding the program politically and economically into the ethos of the system. The focus on thinking began with the development of a district instructional goal. After five years, most teachers in the district had participated in the training, and instructional strategies across the district reflected the thinking focus. District administrators and teachers were hesitant to eliminate a specific instructional goal

CREATING THE THOUGHTFUL CLASSROOM

related to thinking. But, they also realized that at some point other goals would need to be stressed. Consequently, after five years, rather than have a thinking-related instructional goal, the introduction to the instructional goals document was changed to read:

The District 205 instructional goals have been developed to support effective teaching strategies and district curricular needs. Continuing major emphases of instruction are the promotion of a thinking environment in each classroom and the integration of objectives and content across curricular areas.

This continuation of focus politically embeds the continuation of thinking strategies in the classroom since instructional goals direct building and individual goals.

As the umbrella for all other instructional goals, thinking skills also are embedded economically as part of the system. In the first years of the program the major portion of the Illinois State Staff Development Grant was allocated for the thinking skills training. Though other instructional goals need to be supported from the grant funds, the maintenance of the thinking skills training and emphasis has necessitated some use of state funds along with district and building professional growth funds.

Link Instruction

Fullan also stated that institutionalization of an innovation requires linkage to instruction and widespread use. If the innovation does not apply to what teachers do and is not used by a majority of the staff, there is little chance that it will become embedded in the system. The process for change that was implemented with the thinking skills training supported teachers in the transfer of the strategies into the day-by-day routine of teaching. After several years of training in the use of thinking skills strategies, almost all teachers in the district had participated in the workshops.

As other innovative instructional strategies came into the district, they were directly linked to the thinking skills strategies. Establishing a climate for thinking, providing opportunities for students to interact with each other and the tools of learning, developing metacognitive skills, and teaching ex-

plicit thinking skills all were important components of new programs adopted by the district. The revised mathematics program stresses problem solving and the use of manipulatives for teaching concepts. The newly adopted language arts program requires the use of a process approach to writing instruction. Children must use brainstorming and webbing skills in the prewriting component. Paired partners and cooperative groups are used during the conferencing sessions for editing. A literature-based reading program with an emphasis on whole language and integrated instruction also requires teachers to continue using the strategies presented in the thinking training. The traditional textbook-driven science program was revised to reflect a "hands-on/minds-on" philosophy.

Though each program shift has been a major change, teachers have adjusted with minimum frustration since the thinking skills workshops provided them with the basic instructional strategies needed to implement the new programs. Thinking strategies have become linked to instruction across all major content areas and are supporting effective instruction. These strategies provide a common link at the elementary, middle school, and high school levels, as teachers and teams attempt to deliver content through interdisciplinary units.

Continue To Assist

Institutionalization of an innovation requires that assistance be a continuous process. Innovations do not become traditions unless specific plans are developed to support valued change. As teachers retire and new teachers enter the system, a process must be in place to inculcate the beginning teachers into the district's traditions. Two formalized programs in District 205 assure that innovation is institutionalized. All teachers new to the district are assigned a mentor for their first teaching year. Veteran teachers apply to be mentors and participate in a training session prior to an assignment. These veteran teachers work with the new teachers throughout their first year to assist them with all facets of working in the district and delivering content to students. Mentors are expected to have participated in thinking skills workshops and to estab-

lish with new teachers the district's focus on facilitating a classroom in which students are thinkers.

During their first year, new teachers also participate in a new teacher induction program (NTIP). The NTIP workshops provide training in programs that are important to the district. As the new teachers participate in the workshops, their mentors assume the role of peer coach. The new teachers attend workshops on thinking skills, process writing, mathematics problem solving and manipulatives, teaming, and interdisciplinary units.

The experiences of the District 205 staff in creating the thoughtful classroom demonstrate that change requires a long-term commitment to a vision and a process. As Fullan has suggested, educators who want to be change facilitators must be willing to work with the process from initiation to implementation and through institutionaliza-

tion. Also, the institutionalization of change is an ongoing process that requires a continuing focus.

For Elmhurst District 205, the commitment to a change process has been the key factor in the reshaping of instruction. A walk down the halls of the schools in the district would give even the casual observer the sense that in these rooms children are involved learners. The furniture is arranged in a flexible manner so children can work in groups or pairs. Most instruction is presented to the whole group with some flexible groups to meet special needs. All available spaces in the rooms are used to display children's work and materials for learning. There is a hum of activity as children and teachers share the excitement of learning and thinking. The district's commitment to an ongoing change process has provided the children an enriched learning experience.

REFERENCES

- Costa, A. (1984). *Developing minds: A resource book for teaching thinking*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Fogarty, R. (1991). *The mindful school: How to integrate the curricula*. Palatine, IL: Skylight Publishing, Inc.
- Fogarty, R., & Bellanca, J. (1989). *Patterns for thinking: Patterns for transfer*. Palatine, IL: IRI Group.
- Fullan, M. S. (1987, September). *Meaning of educational change*. Paper presented at the Illinois Association for Supervision and Curriculum Development Fall Conference, Matteson, IL.
- Fullan, M. S. (1982). *The meaning of educational change*. Columbia, NY: Teachers College Press.
- Fullan, M. S., & Stiegelbauer, S. (1991). *The new meaning of educational change*. Columbia, NY: Teachers College Press.
- Joyce, B. (Ed.). (1990). *Changing school culture through staff development*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Joyce, B., & Showers, B. (1988). *Student achievement through staff development*. White Plains, NY: Longman, Inc.
- Marzano, R. R., et al. (1988). *Dimensions of thinking: A framework for curriculum and instruction*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Resnick, L. B., & Klopfer, L. E. (Eds.). (1989). *Toward the thinking curriculum: Current cognitive research*. Alexandria, VA: Association for Supervision and Curriculum Development.

COGNITION AND COOPERATION: PARTNERS IN EXCELLENCE

Jacqueline Rhoades and Margaret McCabe

Studies have consistently suggested that many of our students are not developing the skills necessary for problem solving and decision making. Curriculum requirements mandated at the state and local levels appear to be increasing nationwide, and covering the required material often seems to be an impossible task. Students have seldom been treated as thinking people. Instead, they seem to have been viewed as "empty heads" to be filled with specific knowledge and facts for regurgitation on tests and in classroom discussions.

Students learn at a very young age that to be successful in school they must determine what the "right" answers are, then give those answers on assignments and tests. But teaching facts alone is no longer as relevant as it once was. The body of knowledge in some fields is doubling and tripling in two to three years. In other fields, knowledge is doubling in a matter of months. "Facts" as we know them and information relevant today may very likely be obsolete tomorrow. Taking the time to help students develop thinking skills helps them learn how to learn, which is the most powerful skill we can give our young people.

We are gaining significant knowledge about how the brain works, what thinking is, and how thinking occurs. In fact, there is a plethora of research, theories, and ideas. Still, there is no common definition of *thinking* among leading researchers and theorists.

Webster and American Heritage define the verb *think*:

To form or to have in the mind; to call to mind, i.e., remember; to reflect on or consider; to subject to the process of logical thought especially in order to reach a conclusion; to exercise the powers of judgment, conception, or inference as distinguished from simple sense perception; to create or devise. (Gove, 1966, p. 2376; DeVenne, 1985, p. 1263)

This multifaceted definition, combined with research, leaves the field wide open for interpretation. Eventually, as we continue to learn more about how the brain and mind work, we will see more similarities than differences among our leading theorists. One similarity is theorists' views on the relationship between thinking and intelligence. Sternberg posits:

Thinking skills and intellectual skills that constitute intelligence overlap to a great extent. Most thinking

skills are involved in intelligence. Although there is more to intelligence than just thinking skills. For example, intelligence is involved in making information processing automatic but thinking is not. To the contrary, information processing becomes automatic as the amount of thinking, or at least of conscious thinking, decreases. But the ties between thinking and intelligence are extremely close. (Baron & Sternberg, 1987, p. 196).

The concept of intelligence also lacks a common definition, being viewed as either a static or dynamic factor. It is generally agreed, however, that thinking is a component of intelligence and the more complex the thinking patterns the greater the possibility for higher intelligence. IQ assessments are seldom seen as the primary measure of a student's ability level or potential for learning. This perspective coincides with the broad definition developed by Wade and Tavis who view intelligence as "an inferred characteristic of an individual, usually defined as the ability to profit from experience, acquire knowledge, think abstractly, or adapt to changes in the environment" (1987).

This definition of intelligence has become more widely accepted. Earlier researchers concluded that IQ assessments measured overall learning and memory capacity. Their conclusion was based on high correlations between a student's IQ and that student's performance—that is, grades in school (Whimbey & Whimbey, 1975, p. 202). This conclusion led educators to believe that thinking skills could not be taught, which in turn limited the emphasis on teaching thinking.

Interestingly enough, it was Alfred Binet who first refuted this belief in 1901:

Some recent philosophers appear to have given their moral support to the deplorable verdict that the intelligence of an individual is a fixed quantity. ... We must protest and act against this brutal pessimism. A child's mind is like a field for which an expert farmer has advised a change in the method of cultivating, with the result that in place of desert land, we now have a harvest. It is in this particular sense, the one which is significant, that we say that the intelligence of children may be increased. (cited in Whimbey & Whimbey, 1975, p. 113)

The concept of cognitive modifiability—that is, changing or enhancing an individual's level of intelligence—has been well established through the works of Reuven Feuerstein, Arthur Whimbey, Donald Meichenbaum, and others. In *Intelligence Can Be Taught*, Whimbey compared thinking skills to learning a sport (1975, p. 118). The overall skill is presented, and the subtasks are taught in a systematic manner. Take, for example, when tennis is taught. The rules of the game are presented, and the specific skills, such as how to hold the racket and footwork, are taught. Students practice the component skills, and, finally, after sufficient practice and corrective feedback, the game is mastered. So it is with thinking. An individual cannot practice an aspect of thinking without being exposed to that specific skill. A major task of educators, then, is to introduce general skills, teach the subcomponents necessary for understanding, and provide practice opportunities to obtain mastery. Within this theoretical framework, the process of teaching thinking begins.

For the purpose of this chapter, *thinking* is defined as a manifestation of intelligence and is viewed as a "series of mental strategies used by an individual to organize and manipulate previous learning experiences and perceptions in order to assimilate new knowledge, to formulate new ideas, and to make judgments" (Whimbey & Whimbey, 1975, p. 116). Thinking skills can be taught to increase students' intellectual abilities.

FRAME OF REFERENCE

Frame of reference provides a conceptual framework for the teaching of thinking skills. A frame of reference is the sum total of each individual's experience and knowledge. For example, in some parts of the United States a *soda* is a drink made with seltzer water and ice cream, and a *pop* is a carbonated drink sold in a can or bottle. But, in other locations the latter is called a *soda*. What each of these words means depends on a person's frame of reference.

Our ability to assimilate new information and to think about different concepts depends on our frame of reference. Using a computer as an analogy

helps place this concept into perspective. A computer has the capacity to perform various tasks and solve different types of problems. But, until it is programmed to complete these tasks, the capacity for sorting information, making calculations, and solving problems is useless. The same is true of our students; they need to learn how to sort and combine information in order to retain and apply data and information in the given assignment (McCabe & Rhoades, 1989, p. 202).

A concrete example of this premise is the study of algebraic theory. If we have never been exposed to algebra, the equations are nothing more than a jumble of letters and numbers—it's a foreign language to us. Once we have studied algebra, however, the mystery is removed and the equation makes perfectly good sense.

For new information to be relevant, we must be able to either link it to past experience or have some basis for constructing new meanings. Each time we are exposed to a new way to think about something, we add another strategy or path to our thinking abilities. If there is nothing in our past experience or if we are unable to construct new meaning, we will not be able to make sense of the information.

For example, a sixth grade student was reading on a second grade level. She was a bright, likable youngster, who obviously had the capacity to be a good reader. Year after year she had been taught the phonetic sounds of letters. Mastery of phonetics was evidenced by her consistent ability to "sound out" letters. This student had also learned some words by sight, which provided a minimal amount of positive feedback to her. But, her reading problem remained a mystery until a new teacher talked with her about how she approached the task of decoding words phonetically. The teacher discovered that the student did not understand the concept of blending individual phonetic sounds into words. The student lacked the critical information to construct new meaning from the available information—how to integrate and blend phonetic sounds (Rhoades & McCabe, 1985, p. 6).

Teachers have the power to create a classroom environment that expands each student's frame of

reference and teaches thinking skills. Thus, teachers have the power to increase a student's thinking paths, the network that functions as intelligence.

THINKING PATHS

The ability to think about new information is directly related to an individual's frame of reference. We need some sort of reference point to understand new information. Each time we are exposed to a new way to think about something, we add another strategy or path to our thinking abilities. The way we see and interpret the world around us is dependent on the network of thinking paths available. Some individuals may be viewed by others as slow or lacking common sense when, in fact, they have not had the opportunity to experience or learn alternative behaviors.

For example, a person who has written an extensive shopping list enters the market to purchase the items needed. The first item on the list is meat. The shopper takes a grocery cart and goes to the meat section on the north side of the store. The second item on the list is carrots. The shopper then goes to the produce section at the south side of the store. The next item on the list is milk, so the shopper proceeds to the dairy section on the east side of the store. The shopper then crisscrosses aisles to select other items. Some would say this behavior is stupid, when the fact may be that this person has never been taught the skill of organizing a list before shopping. The ability to organize is a thinking skill.

Thinking paths are formed from the first day we are born—some say even in the prenatal state—and continue to develop during one's lifetime. They cluster and connect into thinking banks, from which we can draw to assimilate new information and perceptions. The complexity of thinking paths depends on the type of input and feedback any given individual experiences. Assume it is winter and a child does not close the door after entering the house. Parents may respond to this behavior in a variety of ways.

PARENT #1: "Close the door." To the child, this is just another command to obey.

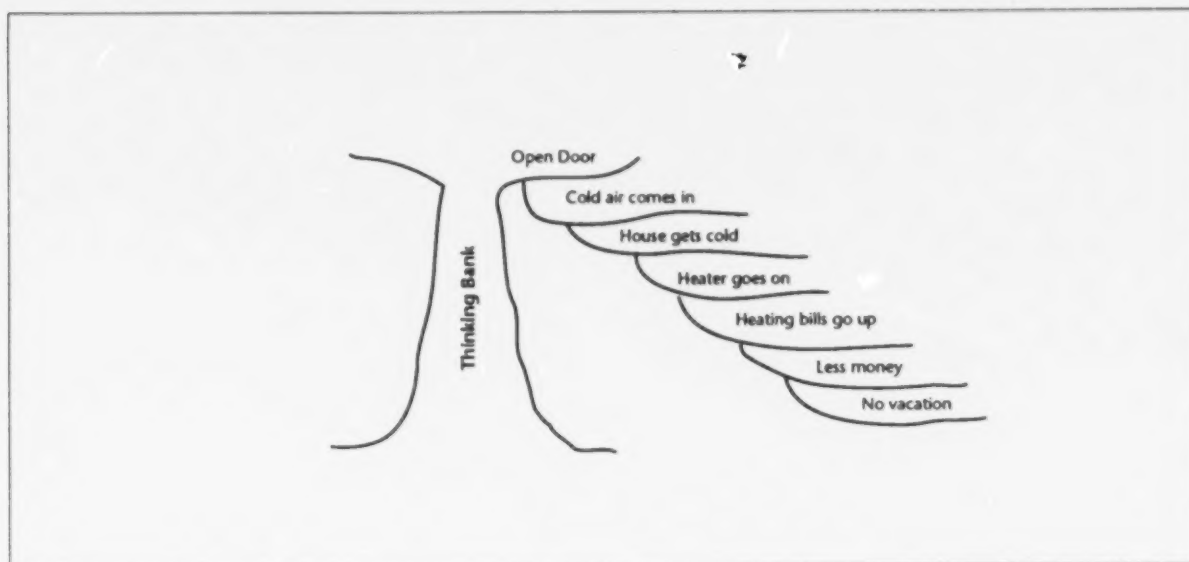


Figure 1 Thinking Paths

PARENT #2: "Close the door; it's cold outside." The child begins to make a mental connection—if the door is open, cold air gets in the house.

PARENT #3: "Close the door. It's cold outside, and the heater will come on." More information results in another mental connection.

PARENT #4: "Close the door; it's cold outside. The heater will come on, and it will cost us money." The child can now make a series of mental connections and begin to learn about cause and effect.

PARENT #5: "Close the door; it's cold outside. The heater will come on, and it will cost us money. If it happens too many times, we will not be able to go to Disneyland." The concepts of cause and effect now become relevant to the child's life.

In each of these instances the stimulus is identical. The parent's response is the critical factor in determining the child's resultant cognitive growth pattern. In other words, this child may be living in a command-only household, in which the reasons behind a given action are never explained. In the context of Benjamin Bloom's taxonomy, the first parent is communicating on level one—just the facts (Bloom, 1956).

These examples can be illustrated by envisioning the sum total of our thinking paths, or our "think-

ing bank," as the trunk of a tree. From this, we can draw on experiences or past learning to assimilate new information. Each limb or branch represents a thinking path (see Figure 1).

Obviously, it is not appropriate for parents to always give detailed responses when communicating with their children. However, if the patterns, as outlined above, persist over a period of years, consider the difference in thinking power between the child of parent #1 and the child of parent #5. The latter child's long-term memory bank will be filled with options.

While early assimilation is an important factor in cognitive development, there is firm evidence that intelligence and thinking ability are not permanently fixed. When speaking of cognitively impaired individuals, Feuerstein said, "It is our conviction . . . that impairments do not reflect any real lack of capacity, but rather ineffective attitudes, faulty work habits, and inadequate modes of thinking—in other words, functions can be trained to operate more adequately" (1979).

Regardless of age, whether two or seventy-two years old, individuals may expand and enhance their intellectual functioning. Developing thinking paths can also be a lifelong process. Specific thinking strategies can be taught through the mediation process. Mediation can occur on a formal or infor-

mal basis. For example, a child may watch his father make a cake. He learns through a vicarious process the steps required to obtain the desired results. The mediation process becomes more formalized when the father notices his son watching and says such things as, "I am measuring two cups of flour," or "The directions say add two eggs." The auditory input from the father strengthens the mediation experience. If the child reads the directions, and measures and mixes the ingredients himself, the mediation experience is enhanced further. Three important variables when providing mediation are time, complexity, and conscious intent.

Time

Mediation requires interaction between two or more individuals. The mediator must invest time to share thought patterns. The amount of time required is related to the task at hand, the recipient's frame of reference, and the importance the individuals place on the subject at hand.

At home, time must be set aside for interaction between parents and children. A 1991 study reported that the average length of time parents and children interact on a daily basis is approximately fifteen minutes (California Task Force, 1991, p. 18). Three-quarters of this time is spent giving instructions and reprimands, leaving little, if any, time for building thinking skills.

While there have been serious attempts to alter instructional methodology in recent years, the vast majority of instruction involves independent tasks, affording little time and few opportunities to share thinking patterns. For students to learn new paths of thinking, a significant amount of time needs to be set aside in the instructional day to provide learning opportunities.

Complexity

While a knowledge base in any area is essential to understanding a concept, knowledge alone does not provide the ability to manipulate the information and to use it in everyday life. Acquiring facts, therefore, becomes the first step of many in becoming an intelligent human being.

Children raised in command-only households, whose parents seldom elaborate beyond "just the

facts," are certainly at a disadvantage when entering school. Also, in many instances, the school environment continues this depressed pattern of stimulation. Research notes that ninety-three percent of the interaction between teacher and student during the school day falls within the knowledge category. A major challenge for our school system is to raise the level of complexity of the school environment beyond just the facts.

Conscious Intent

Mediation is enhanced when it is done with conscious intent. In other words, a skill is selected and a plan is developed to enhance the mediation process.

COOPERATIVE LEARNING AND THINKING

The cooperative learning process inherently facilitates the teaching of thinking skills. Cooperative learning requires students to work together to complete assignments, study academic content, and/or agree on responses for a worksheet or test. The teacher is no longer the sole mediator of learning. Each student in the group becomes a mediator when explaining personal thinking processes. When working in a group, students may not simply state their answers, they must share how they arrived at their answers. Through this explanation they help other students develop thinking paths because:

1. all students must think about their own thinking. Thinking about how one thinks is called *metacognition*, an important attribute in effective thinking. Teachers should be alert to aspects of metacognition and heighten students' awareness of the process by
 - modeling metacognition by sharing thought processes with students,
 - labeling spontaneous processes—for example, verbalizing thought processes while solving a problem, and
 - encouraging students to metacogitate about concrete objects.
2. students are sharing their *internal dialogue*—that is, what they said to themselves when con-

fronted with the specific question, problem, or situation.

3. sharing what they thought and how they actually arrived at their conclusions mediates the development of other students' thinking skills. It gives students alternatives to thinking about specific events, situations, problems, and content material. It provides new thinking paths, increasing the students' thinking banks from which they can draw when faced with the same or similar situation or problem.

The more thinking paths a person has, the more ways the person has to deal with new perceptions, experiences, and information. Our thinking paths are directed by our internal dialogue, the consistent self-talking that goes on in our minds. When confronted with any situation, we begin talking to ourselves about how best to approach it. Our minds search through past experiences to find a similar situation. We then discuss with ourselves how we dealt with that situation in the past and how successful or unsuccessful our actions were. The group-process experience develops thinking paths. If we have not had direct experience with a situation, our minds can search for examples and solutions provided by other group members.

Students should be taught the concepts of thinking paths, internal dialogue, and mediation. When explaining mediation and internal dialogue to students, it's important to point out that we each have different ways of thinking and approaching problems. The more ways we have of thinking, the greater our chances of finding successful solutions to problems and making good decisions in the future. While there are no right and wrong ways to think, different strategies work better in different situations. Thus, it is beneficial to have as many thinking strategies as possible.

Students need to know that effective thinkers talk to themselves continuously. This is called self-talk or internal dialogue. When we share how we arrived at our answers, we are sharing our internal dialogue. This, in turn, mediates the thought processes of other group members and gives everyone new ideas, new paths of thinking. In order to explain how we arrived at an answer, we must examine

our own thinking processes. We must think about what we thought and how we thought it. Metacognition helps us become more effective thinkers (Whimbey, 1980). Because students enjoy the prospect of helping each other learn how to think differently, they approach their group discussions with enthusiasm.

Activities that enrich the mediation process include the following:

- Discuss the meaning of words. For example, have groups agree on a common definition of the word *surplus* when discussing government subsidy in relation to farming.
- Have the group "walk through" the thinking strategies they used in finding a solution to the problem.
- Ask the group to generate questions from a passage they have just read.
- Conduct self-evaluations. Ask group members to evaluate their academic or social performance in the group.
- Relate the past and present to the future. For example, relate how learning the Pythagorean theorem today will be useful to the student in the future.

WRAP-UPS

The wrap-up is another effective tool for teaching thinking paths. A wrap-up is a brief activity that immediately follows a cooperative lesson. It may be completed in small groups or with the whole class, and it may be written or oral. The wrap-up activity focuses on a social skills objective or an academic objective. It also provides students an opportunity to enhance their thinking and communication skills. The wrap-up provides closure by asking students to analyze their use of specific skills or what they learned from the academic content.

The wrap-up provides an opportunity for transference or bridging. Whatever the content of the wrap-up activity, internal dialogue is shared, and mediation and metacognition occur. The wrap-up can be structured to enhance any level of thinking desired, including recall, analysis, and synthesis of content information. The opportunities to develop

thinking skills through wrap-up activities are infinite. Some examples of wrap-ups include the following:

- After completing this assignment, one question I have is
- I can use the information I learned today in the future by
- One way I contributed to my group was
- One new thing I learned was
- I disagree with because
- I felt the greatest strength of the character in this story was
- If I had lived in that era, I would feel
- One frustration I felt during this activity was
- One good feeling I had during this activity was
- The way I reached my conclusion was

HIGHER-LEVEL QUESTIONING

Infusing higher-level questioning into cooperative lessons is another powerful technique for building thinking skills. If we are to help students develop effective thinking skills, we need to move beyond asking questions that require mere recall of facts. One taxonomy that can be used is Bloom's (1956):

Knowledge: to define, recognize, recall, identify, label, and collect. Example: Name the last three U.S. Vice-Presidents.

Comprehension: to translate, interpret, explain, describe, summarize, and extrapolate. Example: Explain the importance of the Civil Rights Act.

Application: to apply, solve, experiment and predict. Example: Construct a chart showing the inflation percentages of the last ten years.

Analysis: to connect, relate, differentiate, classify, arrange, group, organize, distinguish, categorize, compare, and infer. Example: Listen to three television commercials and determine which parts are fact and which are inferences.

Synthesis: to produce, propose, design, plan, combine, formulate, compose, and hypothesize. Example: Using real issues in the community, write a speech for a candidate for mayor.

Evaluation: to appraise, judge, criticize, decide. Example: How does the author support the main premise?

Designing lessons that include questions that promote higher-level thinking should be a part of every teacher's overall plan. Following is just one example of how this can be accomplished easily, without purchasing extra materials. The content is a magazine ad showing a truck and the caption, "IT'S ALL TRUCK." Beneath this banner is a list of the truck's selling points, including its load capacity and horsepower. Give each group a copy of the advertisement and ask them to respond to the following:

KNOWLEDGE: Identify the make of the truck.

COMPREHENSION: Explain the significance of the caption, "IT'S ALL TRUCK."

APPLICATION: How could a farmer use this truck?

ANALYSIS: Some statements in the ad are facts and some are opinions. Write a list identifying which statements are facts and which are opinions.

SYNTHESIS: Write an ad to sell your bike.

EVALUATION: Based on your analysis of this ad, would you buy this truck? Why or why not?

These questions require the group members to apply the skills of a good thinker, to be aware of their own internal dialogue, and to share their internal dialogue. The questions, combined with the group process, promote effective thinking.

ASSESSING THINKING SKILLS THROUGH OBSERVATION

Effective thinking is not synonymous with knowledge. It cannot be called up from the recesses of

memory on demand, such as Wednesday between 9:00 and 10:30 when a test is scheduled. Thinking occurs at all times—at odd times, out of the blue, in the middle of the night, in the midst of routine, and during trivial tasks.

Assessing thinking skills with a paper-and-pencil test places our students in untenable situations, but there is a technique teachers can use to measure thinking skills. It isn't perfect, but it seems fairer and more reliable than paper-and-pencil tests—observation. Through careful observation over an extended period of time, teachers can gain some idea of the effectiveness of a student's thinking processes. By using a list of effective thinking behaviors based on research by Luis Rath, Art Costa, Margaret McCabe, and Jacqueline Rhoades, we can begin to identify behaviors that are considered to be reflective of effective thinking.

First, a word of caution. While a list of behaviors associated with effective thinking can be a powerful guide, labeling any individual immediately sets up an expectation level, which in turn limits the individual's growth and progress. In reality, each person's thinking behaviors most likely fall somewhere on a continuum between what could be considered effective and ineffective thinking. Each person also exhibits strengths in some areas, weaknesses in others, and their strengths and weaknesses at different times. Rather than rating or grading students, use the following list as a guide to identify areas that seem to indicate a weakness in a student's thinking processes. Then design specific lessons to enhance those aspects. The important element is to provide experiences through which students can enhance and expand their thinking paths.

Obviously, making conclusions about others' thoughts, based solely on their behavior, would be

nothing short of ridiculous. But, through observation, we can certainly tell if students are actualizing thinking behaviors in the classroom. Following are some qualities of students who exhibit effective thinking behaviors that may be used for observations (McCabe & Rhoades, 1989).

- Goal-oriented. Plans short- and long-range goals and develops plans to reach goals. This is true of class assignments as well as of other aspects of life. Considers possible consequences of behaviors.
- Self-initiator. Completes assignments with little or no prompting and encouraging.
- Open to ideas of others and to different ways of doing things. Considers new ideas and examines their strengths and weaknesses. Seeks new ideas from others and from readings.
- Listens to others with understanding and empathy. Is eager to listen to other points of view. Can clarify by asking questions and paraphrasing, and can detect indicators of feelings.
- Confident. Expresses own ideas freely and is not afraid to be wrong. Enthusiastically participates in class discussions.

Observation, as with all cooperative techniques, can become a powerful instructional tool, giving the teacher specific information from which to guide students into effective thinking habits.

CONCLUSION

Thinking skills are essential for a successful life. Different thinking strategies or thinking paths can easily be taught through cooperative learning, because cooperative learning strategies enhance the development of thinking skills.

REFERENCES

- Baron, J. B., & Sternberg, R. J. (1987). *Teaching thinking skills: Theory and practice*. New York: N.H. Freeman.
- Bloom, B. (1956). *Taxonomy of educational objectives*. New York: Longman.
- Caine, R., & Caine, G. (1990, October). Understanding a brain-based approach to learning and teaching. *Educational Leadership*, 48(2), 66-70.
- California Task Force to Promote Self-Esteem and Personal and Social Responsibility. (1991). *Toward a state of self-esteem*. Sacramento, CA: California State Department of Education.
- Costa, A. (1991). Toward a model of human intellectual functioning. In A. Costa (Ed.), *Developing minds: A resource book for teaching thinking*. (pp. 137-140). (2nd ed.). Alexandria, VA: Association for Supervision and Curriculum Development.
- Costa, A. (1984, November). Mediating the metacognitive. *Educational Leadership*, 42(3), 57-62.
- DeVine, P. B. (Ed.). (1985). *American heritage dictionary*. Boston: Houghton Mifflin.
- Feuerstein, R. (1980). *Instrumental enrichment*. Baltimore, MD: University Park Press.
- Feuerstein, R. (1979). *The dynamic assessment of retarded performers*. Baltimore, MD: University of Park Press.
- Gove, P. B. (Ed.). (1966). *Webster's third new international dictionary*. Chicago: G & C Merriam.
- McCabe, M., & Rhoades, J. (1989). *The nurturing classroom: Developing self-esteem, thinking skills, and responsibility through simple cooperation*. Willits, CA: ITA.
- Meichenbaum, D. (1977). *Cognitive behavior modification*. New York: Plenum Press.
- Presseisen, B., Sternberg, R., Kischer, K., Knight, C., & Feuerstein, R. (1990). *Learning and thinking styles: Classroom interaction*. Washington, DC: National Education Association and Research for Better Schools.
- Rhoades, J., & McCabe, M. (1985). *Simple cooperation in the classroom*. Willits, CA: ITA.
- Sternberg, R. (1984, September). How can we teach intelligence? *Educational Leadership*, 42(1), 38-47.
- Wade, C., & Tavis, C. (1987). *Psychology*. New York: Harper & Row.
- Wasserman, S. (1989, January). Reflections on measuring thinking while listening to Mozart's Jupiter symphony. *Phi Delta Kappan*, 70, 365-370.
- Wasserman, S. (1987, February). Teaching for thinking: Luis E. Raths revisited. *Phi Delta Kappan*, 68, 460-465.
- Whimbey, A. (1980, April). Students can learn to be better problem solvers. *Educational Leadership*, 37(7), 56-65.
- Whimbey, A., & Whimbey, L. S. (1975). *Intelligence can be taught*. New York: Bantam Books.

THE NINE BASICS OF TEACHING THINKING

David Perkins and Robert Swartz

Everyone thinks. Thinking is a natural function of the human organism. It does not have to be taught any more than walking does. Yet throughout human history, people have sought to cultivate thinking. Socrates, Aristotle, Francis Bacon, and others set forth principles for good thinking. The noted American philosopher of education John Dewey emphasized the importance of thoughtful learning. Over the past two decades, educators, psychologists, and philosophers have worked hard to make the teaching of thinking more of a presence in public education. For something as natural as walking, thinking seems to be getting a lot of attention!

Why? And if thinking deserves attention, what kind of attention should it get? The answer to the first of these questions proves relatively easy. While everyone thinks after a fashion, people often do not think nearly as well as they might to serve their own best interests and those of others—to study well, to make important decisions in life, to solve problems, to respond inventively to circumstances, to exercise judgment free of bias and prejudice, and so on. So it is not thinking, per se, that attracts all the fuss, but improving thinking.

As to the second question, over the past several years, the two of us have been part of the contemporary effort to encourage more attention to the cultivation of thinking in schools. We believe that all students can learn to think better than they do—including the gifted ones and also those who are slow learners or at risk. We have participated both in research and in practical programs designed to help students think better. In these few pages, we try to boil down some basic principles about teaching thinking.

WHY, HOW, AND WHERE TO IMPROVE THINKING

Why Improve Thinking: Unfortunate Default Patterns

Since everyone thinks, why teach thinking? As already noted, thinking should be taught because most people do not think nearly as well as they might. Everyday experience gives us abundant evidence of this. Political speeches present endless examples of short-sighted reasoning. Many teachers also note that their students do not think very carefully about what they hear in classrooms or

read in textbooks. In their oral and written work, students seldom show careful critical or creative thinking about the topic at hand. Moreover, testing by the National Assessment of Educational Progress and other programs underwrites teachers' impressions that students do not think nearly as well as we would like. Finally, we all occasionally see friends and colleagues make decisions that seem ill-considered or express views that seem narrow or biased (for a research-based perspective on shortfalls in thinking, see Perkins & Salomon, 1988).

Of course, less-than-ideal thinking proves more readily visible in others than in ourselves. But here is a simple exercise that usually reveals some of our own shortcomings (Swartz & Parks, 1992a,b). Think of three or four decisions you have made in the last several weeks that turned out badly. Almost everyone has such experiences. Now review each decision. Ask yourself, "What went wrong?" And then ask yourself, "Is there something I could have done while making the decision so that it would have come out better?" Sometimes your answer may be "No." You did your best, but circumstances conspired against you. For other decisions, however, you are likely to find that you could have done a better job. Perhaps you could have explored more options and found a better one. Or you could have examined more fully and carefully the options you were considering.

It is useful to sum up the typical failings of human thinking into four *defaults*. A *default* is something that people fall into automatically, unless they make some effort to behave differently. Here are the principal defaults that plague our everyday thinking.

- *Hasty*. We reach conclusions and take actions without sufficient thought or attention to standards of judgment. Perhaps you did not give enough thinking time to some of the decisions that you have recently made.
- *Narrow*. Our thinking is blinkered. We fail to consider the other side of the case, the contrary evidence, alternative frames of reference and points of view, more imaginative possibilities, and so on. For instance, perhaps you did not search widely enough for options in one of your recent decisions and missed the best bet.

- *Fuzzy*. Our ideas are not clear, distinctions not sharp. Everything is all muddled. Perhaps you did not take a long, hard look at your priorities during a recent decision. And because you were fuzzy about what was most important, you made the wrong choice.
- *Sprawling*. Our thinking is disorganized, all over the place, fails to come to a point. Perhaps you faced a complicated decision recently and got lost in the maze of circumstances. Finally, in exasperation, you just did something; unfortunately, not the right thing.

Why do the defaults of hasty, narrow, fuzzy, and sprawling thinking plague *Homo sapiens*? After all, we're supposed to be smart! The answer lies in the complexities of human psychology. One factor is the usually high payoff of reflexive rather than reflective thinking. For much of everyday life, reflexive responses are good. They do the job quickly and save us time and effort. Unfortunately, when occasional problems and decisions require more reflection, the mind often defaults to a reflexive response anyway. By definition, hasty, a reflexive response, also tends to be narrow, relying on convention and past experience rather than on imaginative and unbiased exploration.

Another factor is the tender human ego. Often, we find ourselves invested in a particular viewpoint or group identity. It is difficult to think broadly and see matters from another perspective without threatening our self-image and self-confidence.

Still another factor recognizes the genuine complexity of the world. Many distinctions are subtle (between weight and mass in physics for instance), many priorities are obscure (which do you really want more, X or Y?), and many situations are labyrinthine (if I do A, he may do B, or C, or maybe D; and if he does B, I should ...). Unless we work hard and systematically at maintaining distinctions and staying oriented, thinking tends to get fuzzy and sprawling.

All this is both bad news and good news. The bad news is that leanings toward less-than-ideal thinking are built into the human mind. It is natural not to think so well. The mind tends to slide toward hasty, narrow, fuzzy, and sprawling thinking in many circumstances.

The good news is that all this makes the goal of better thinking quite understandable. To a first approximation, better thinking is not anything technical or academic. It is giving thinking more time, making your thinking broad, and exercising care, precision, and systematic organization. Good thinking is everyday thinking done better. In summary:

Basic #1. *Why improve thinking? Because, by default, everyday human thinking tends to be hasty, narrow, fuzzy, and sprawling. We can help learners do better without recourse to any technical concept of good thinking.*

How To Improve Thinking: Thinking Organizers

The notion of the four thinking defaults brings into focus the challenge of teaching thinking. To help students counter the defaults, we need to help them give thinking more time, broaden their thinking, work for clarity and precision, and maintain some systematic organization.

How? The natural impulse is to give students experience with better patterns of thinking. To combat hastiness, let us engage students in discussion and writing that give thinking time. To broaden their thinking, let us engage them in activities that stretch their minds, such as arguing the side of a case opposite one's own or brainstorming. Such experiences benefit students and are to be applauded.

But they do not do the whole job. One of the most telling discoveries in recent efforts to teach thinking comes down to this: Mere experience is not enough. Even repeatedly experiencing a particular kind of thinking often does not help students get better at that kind of thinking. For example, engaging students in debates does not in itself necessarily make them better at debating or reasoning more generally.

Moreover, experiencing better thinking practices in a classroom context does not reliably lead students to putting that kind of thinking into action in other settings. For instance, students who have learned the importance of attending to both sides of a case through classroom debates do not necessarily show more attention to both sides of the case in other reasoning situations. Again, experience is not enough.

What goes wrong? The problem is that mere experience with better thinking practices often does not

make clear the point or importance of the revised practices. Nor does it give learners ways of reminding themselves later about those better practices. Like much else that happens in classrooms, the experience becomes "something you do on Fridays in English," or the like.

In our view, the answer to this dilemma is the use of *thinking organizers* to reorganize thinking. (One can also speak of thinking "frames"—see Perkins, 1986b,c). *Thinking organizers* are verbal or graphic symbols that remind us how to reorganize our thinking away from the four defaults and guide us along as we think. While some approaches to improving students' thinking do not emphasize thinking organizers, many do.

The idea of thinking organizers may sound esoteric, but it is not. Thinking organizers are quite commonplace, only we often do not recognize them for what they are. To appreciate both how ordinary thinking organizers are and how they do their work, let us look at a familiar example: the pro-con list. Many people occasionally jot down pros and cons to size up a yes-or-no decision. It's common to use a two-column chart, cons on the left and pros on the right, or vice versa.

Notice how this simple strategy works against the four defaults. First of all, the mere fact of drawing and filling a pro-con list guarantees that you are giving thinking time. Second, the pro-con list has built into it a strong call for even-handed thinking, which looks at both sides of the case. It sets aside a column for the pros and a column for the cons. Third, the pro-con list forces you to categorize factors either as pros or cons. Indeed, often factors emerge that are both pros and cons in different ways, so you need to add them to both lists. All this works against fuzzy thinking, bringing clarity to how different factors bear on the decision. Fourth, the pro-con list combats sprawling thinking by keeping you on track. It is hard to get lost in the problem with a clear delineation of pros and cons staring you in the face.

Let's generalize. A thinking organizer is a concrete, verbal, and/or graphic structure that guides thinking. Later, we will give some examples of thinking organizers especially useful for improving thinking through subject matter instruction. For now, we want to emphasize further how common-

place thinking organizers are, once you know how to recognize them. Here is a brief list of everyday thinking organizers.

- *Proverbs.* Proverbs and the like are a folk repository of thinking organizers. For instance, such sayings as "look before you leap" and "a stitch in time saves nine" work against the hasty thinking default. Such phrases as "use your imagination," "let's take a new approach," and "put yourself in his shoes" work against the narrow thinking default.
- *Analytical concepts and terms.* Many concepts and terms in English or other languages help us organize our thinking. For example, if you speak the "language of argument," you can ask another or yourself, "What's the claim here? And the arguments are what? Do you have any evidence for that generalization? Your first reason, how does that support your conclusion?"
- *Dispositional concepts and terms.* Many have pointed out that good thinking is more than technique. It's a matter of spirit or what are often more technically called "dispositions." Many concepts and terms in the English language express a commitment to kinds of thinking. We encourage people to be *fair*, *just*, *open-minded*, and *imaginative*, for example. Such terms do not have much analytical content in the way that *claim*, *evidence*, and *support* do. But they are loaded with affect. For example, the terms mentioned all appeal in one or another sense for broad rather than narrow thinking.
- *Familiar strategies.* Some thinking strategies are so familiar that they are a common part of our culture. Brainstorming is an obvious example, with its simple rules about not criticizing, piggybacking on one another's ideas, and so on. Another is the pro-con list. Yet another is the common counsel to find out someone's reasons behind an idea that seems odd, rather than rejecting it out of hand.
- *Common graphic organizers.* While the pro-con list is one common graphic organizer, there are others. For instance, people frequently

make plans by listing steps. The list allows you to stand back, look at your plan, and revise it, helping you avoid fuzzy and sprawling thinking. In yet another example, people commonly use tables with two or more columns—for instance for budgets or supplies—organized by category or tasks and the people to whom they are assigned. Such tables help you clarify thinking that may initially be fuzzy and help you maintain some systematic organization, rather than getting lost in the many tradeoffs of complicated products.

With all these thinking organizers part of everyday culture, why don't we all think perfectly? Unfortunately, most knowledge people have is "passive" rather than "active." People know about it, but don't do anything with it. This applies to everyday thinking organizers as much as to other kinds of knowledge. For example, most people know such terms as *claim*, *reason*, *support*, *evidence*, and so on. Yet, in everyday reasoning or argument, people often make little use of such terms. This "language of argument" sees little use in ordinary classrooms as well.

This is unfortunate, but it does have a bright side. To a significant extent, the teaching of thinking does not involve teaching entirely new thinking organizers. It involves reminding people of what they already know, making it more explicit and emphatic, and exploring and emphasizing its importance. In summary:

Basic #2. *Better thinking depends on better organization. To improve thinking, we need to cultivate explicit use of the verbal and graphic organizers learners already know and introduce them to some they do not know.*

Where to Improve Thinking: Infusion into Content Area Instruction

Three broad approaches to teaching thinking have been practiced widely since the early 1980s: direct instruction in stand-alone thinking programs outside the regular curriculum (we can call this the teaching of thinking); the stimulation of higher-order thinking within regular content instruction (we can call this teaching for thinking); and infusion (Swartz, 1991a,b; Swartz & Perkins, 1990; regarding for and of, see Brandt, 1984; Costa, 1991a).

Stand-alone approaches include separate courses or minicourses (Baron & Sternberg, 1986; Nickerson, Perkins, & Smith, 1985). By and large, such programs focus on specific thinking organizers. Also, students typically think about issues that are not part of the subject matter. For example, in a well-known stand-alone program, students imagine that all cars are painted yellow. They think about the positive, negative, and interesting aspects of such a situation, applying a specific strategy called PMI (a thinking organizer), which they learn to use through this kind of practice. In another program, students compare and contrast objects in the school classroom by listing their similarities and differences. "Compare and contrast" is a verbal thinking organizer, typically reinforced by two-column charts or other graphic organizers. Students get better with practice and learn that insights can be discovered through such comparing and contrasting.

In teaching for thinking, the second approach, stimulating thinking in content area instruction has a distinctive character. It amounts to what the previous section called "giving students experiences" of better thinking practices within content areas. Teachers do not ask students to think about yellow cars or objects in the school classroom, but rather about topics in the subject matter of concern. Students might be challenged to write about why the plague spread so easily in medieval Europe, or how Macbeth compares to Hamlet, or to prepare themselves to discuss these questions in class. We see here a deliberate effort to move beyond questions that merely prompt recalling to more challenging higher-order or Socratic questions. This can stimulate some interesting and provocative thoughts. But instruction time gets spent solely on the content—what students are thinking about—with no direct attention to thinking organizers or reflection on the thinking itself. Thinking organizers may be used incidentally, for instance a compare-and-contrast chart, but without identifying them as general tools for organizing thinking. The treatment of thinking remains tacit and tends not to carry over to other settings.

Thus, the teaching of thinking and teaching for thinking both have their limitations. The first, with its stand-alone model, addresses thinking explicitly

but does not contribute directly to deepening content area instruction. Moreover, in many school settings, time proves difficult to schedule. Teaching for thinking within content areas treats content more deeply and gives students experiences of better thinking, but without the direct cultivation of thinking. Recall from the last section that thinking needs direct attention to grow.

Infusion is a best-of-both-worlds approach. It involves the explicit attention to thinking, but in the context of content area instruction. It is the approach we recommend. The others may be used too, as valuable complements, but in our view infusion is an essential ingredient.

More specifically, infusion involves direct instruction in the use of effective thinking organizers during content instruction, supported by student reflection and attention to transfer of the thinking organizers to other situations. It also involves direct engagement with challenging and important questions about the content. The students apply the thinking organizers to the content, learning about both at once. Both improvement in thinking and enhanced content learning are the goal. Figure 1 expresses the relationships among the stand-alone, stimulation, and infusion approaches.

There are several approaches to infusion, although far fewer than to stand-alone instruction. Concerning our own work, we discuss infusion in *Teaching Thinking: Issues and Approaches*. Perkins has developed *Knowledge as Design* (1986a) and a recent overview of the importance of thoughtful learning, *Smart Schools* (1992). Perkins and colleagues have developed the *Connections* program (Mirman & Tishman, 1988; Perkins et al., in press; Tishman, 1991). Swartz has contributed infused science lessons to *Addison-Wesley Science* (1989), and Swartz and Parks have developed the program *Infusing Critical and Creative Thinking into Content Instruction* (1992a,b), which includes handbooks for elementary and secondary school teachers. Our comments here focus on the principles involved, principles that can be found in other materials or applied by committed and experienced teachers on their own.

What does the infusion approach actually look like in action? The way infusion plays itself out in the classroom can best be seen by looking at the

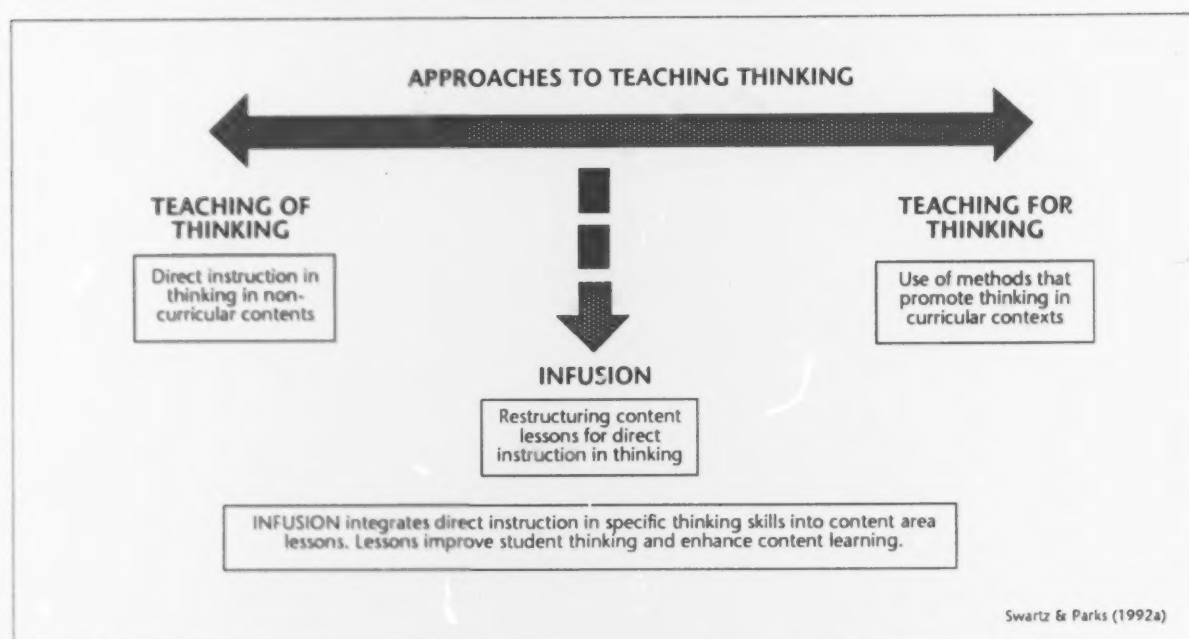


Figure 1 Approaches to Teaching Thinking

lesson on the extinction of the dinosaurs in Figure 2. Notice the engagement with a topic of prime importance in elementary and middle school science, but also the way direct instruction in the thinking being taught—causal explanation—weaves together with the content. Notice, in particular, the use of explicit verbal and graphic organizers, together with strategies for helping students reflect metacognitively on their thinking, as well as transfer of it to other contexts. Metacognition and transfer are important aspects of teaching thinking that we will discuss later.

Basic #3. *Infusion means direct and explicit attention to teaching thinking within content area instruction. Students' thinking benefits, and content learning proceeds with much more depth. Efforts to teach thinking should include infusion (stand-alone instruction and efforts to stimulate thinking during content instruction may be valuable complements).*

THE ART OF TEACHING THINKING

Attention to Skills, Processes, and Dispositions

Some approaches to the teaching of thinking emphasize very particular kinds of thinking, such as

brainstorming, assessing the reliability of a witness' report, or identifying main themes of paragraphs. These relatively focused ways of organizing thinking might be called *thinking skills*.

Other approaches to the teaching of thinking emphasize larger, more encompassing thinking organizers, such as a three-step decision-making plan: (1) generate options; (2) assess each option in terms of consequences and payoffs; (3) synthesize the assessments to yield a decision. While the individual steps in this plan are relatively focused skills, we can call the overall plan a *thinking process*. In other words, thinking processes are larger organizations of thinking that are made up of thinking skills. Figure 3 illustrates this relationship for a particular thinking process, decision making, showing a number of the subskills that play themselves out as we work through an organized strategy for the process.

An ensemble of core skills can be organized into three basic categories: generating ideas, clarifying ideas, and assessing the reasonableness of ideas. (Swartz & Perkins, 1990). Skills in the first category are traditional creative thinking skills; in the second, traditional skills of analysis; and in the third,

THE EXTINCTION OF THE DINOSAURS

SCIENCE

GRADES

LESSON OBJECTIVES

CONTENT

Students will learn that there are different theories about the extinction of the dinosaurs and that the only scientific evidence we have today about what caused their extinction is from fossils and other prehistoric remains.

THINKING SKILL

Students will learn to develop alternative hypotheses and consider present evidence when trying to make a judgment about what caused something to happen.

LESSON

INTRODUCTION TO CONTENT AND PROCESS

- When things happen that we don't like, we often try to find out what is causing them. If we find out the cause, we can sometimes fix it. If the picture on your TV is fuzzy and you know it is because the antenna is pointing in the wrong direction, you can fix it by moving the antenna. If that's not the cause, you may not be able to fix the picture until you find out what the cause really is. Trying to find a cause requires some careful critical thinking.
- Finding out what causes something is called *causal explanation*. This involves thinking about possible causes and then deciding which is the real cause based on evidence. Scientists do this all the time. When we don't know a cure for a disease, scientists try to find out what causes the disease. That may help them find a cure. When there's a natural disaster like a flood, scientists try to find out why it occurred, in order to prevent it in the future. This lesson is going to give you a chance to learn how to think carefully about a situation in order to find a cause.
- Scientists are not just interested in things like floods that happen today. They are also interested in major changes that happened to the earth a long time ago. One thing that has puzzled scientists for a long time is what happened to the dinosaurs at the end of the Mesozoic Era. No one knows why they became extinct, but it's worth thinking about what could have caused their extinction and how we could find out. We might be able to learn something that will help us prevent other species from becoming extinct in the same way.
- Dinosaurs lived for a very long time. Even though there were lots of them and many were huge animals, not one survives today. Some were plant eaters only; others ate meat and hunted other animals. What other things do you know about what the world of dinosaurs was like?

THINKING CRITICALLY

- List different possible conditions that could cause the dinosaurs to become extinct. Work in collaborative learning groups to brainstorm as many possibilities as you can. Make sure you include different and unusual possibilities.
- Suppose you looked for clues about which of these possibilities was the likeliest explanation. What sorts of things might you find today that could give you evidence for or against each possibility? How could you go about finding these things out? Each group should pick one of these possibilities and make a list of the possible evidence using the graphic organizer for causal explanation.

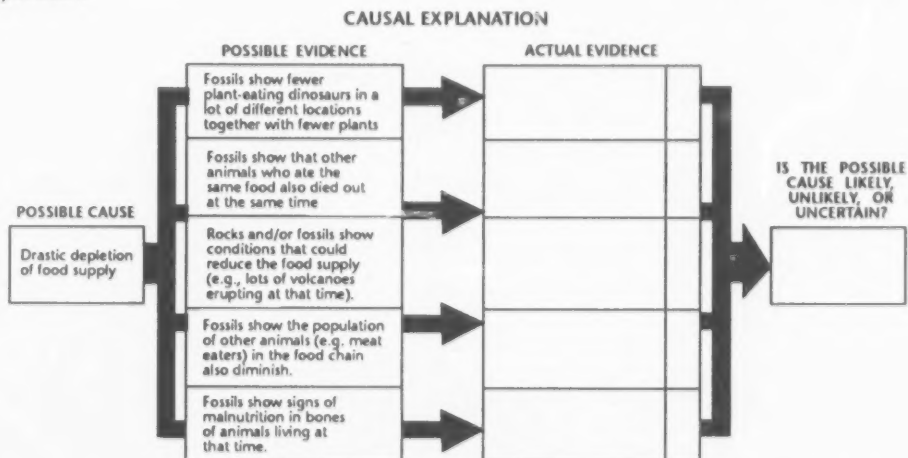


Figure 2 Causal Explanation

CREATING THE THOUGHTFUL CLASSROOM

- Imagine that while looking for clues you find the following in various sedimentary rocks:
 - lots of dinosaur tracks at one level, fewer at another, and then none.
 - fossilized leaves and plants at one level, and then very few.
 - more mammal tracks and bones in some levels than in others.

When you bring these to a laboratory for Carbon 14 dating, you find that the plants and leaves coincide with a lot of dinosaur tracks. The layers with fewer plants came just before there were fewer, and then no other dinosaur tracks. The increase in mammal bones came as the dinosaur tracks were diminishing.

What possible explanations does this evidence count in favor of?

- Scientists shouldn't accept an explanation until they have sufficient evidence to be sure. Is this sufficient evidence? Why? What other evidence would you need to be sure that this was the best causal explanation?
- Do you know of any other evidence that has been found about the extinction of the dinosaurs either from your text or from other sources? What possible cause(s) does this evidence count in favor of? What possibilities does this evidence count against? Fill in the evidence on a graphic for those possible explanations.

THINKING ABOUT THINKING

- Map out the way you tried to figure what caused the extinction of the dinosaurs. What did you think about first, next, etc? How well does this map of causal explanation represent what you did?
- Compare what we considered to the way you ordinarily think about causes. Which do you think is the better way to try to find causes? Why?
- Think about a "causal" situations that comes up for you often, like causes of sickness or causes of problems around the house. Plan what you might think about the next time you don't know what caused something and want to find out.

CAUSAL EXPLANATION

1. Possible causes?
2. Possible evidence?
3. Actual evidence?
4. Likely causes?

APPLYING YOUR THINKING

Immediate Transfer:

- We have studied other animals that are classified as endangered species. Make a list of these and then pick one you'd like to study further. Use your plan for causal explanation to determine what is causing them to be endangered. Do you have any ideas about what we might do to help these animals? Explain.
- There are a number of things that happen at school that many students and teachers are concerned about: lots of noise in the cafeteria, a great many library books get lost every year, etc. Select something that could be changed to make our school better. Try to find out the cause(s) of some of these things so we can recommend some remedies.

Reinforcement Later:

- We're going to be studying the increase in the population of mammals after the Mesozoic Era. When we do, we'll try to figure out why this happened using the same strategy for causal explanation.

WRITING/ART EXTENSION

After the students have brainstormed possible causes of the extinction of the dinosaurs, ask them to pick one of these and write a story about how this could have killed the dinosaurs. Ask them also to draw some pictures to go along with their stories.

LIBRARY RESEARCH EXTENSION

After the students have searched their textbooks for evidence about what caused the extinction of dinosaurs, ask them to use the school library and find books or articles in which people have discussed the extinction of dinosaurs. Have them record explanations for extinction that they find and the evidence that is offered to support them. They should report to the class on these different theories and discuss whether they are well supported.

Adapted from Swartz & Parks (1992a) and Barman, et al. (1989)

Figure 2 (continued)

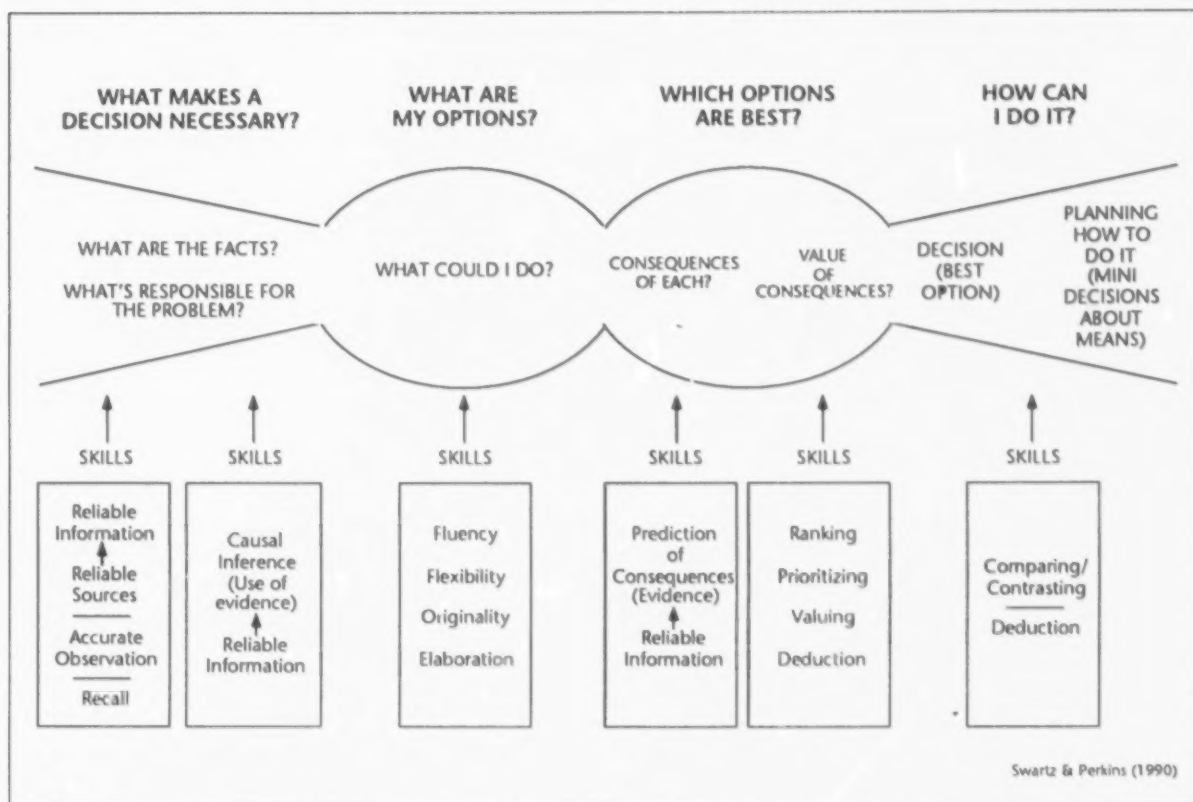


Figure 3 Relationships of Thinking Skills

skills of critical thinking related to making well-founded critical judgments. (See Figure 4).

Of course, the distinction between skills and processes is only rough. But it has some importance for pedagogy. Both thinking processes and the thinking skills they involve need attention. At each of the two levels we fall prey to the defaults of thinking.

Unfortunately, many approaches to the teaching of thinking neglect one level or the other. Some concentrate on skills only. They reflect an atomistic approach, all too common in other subjects such as mathematics, which breaks down the domain in question into small units isolated from one another and teaches them one at a time. Often, the units never come together in students' minds to empower them to undertake broader, more meaningful tasks. For instance, students may learn the *skill* of comparing and contrasting but they should also learn to apply this skill in the context of the *process*

of making decisions, together with other skills important to good decision making.

While atomism is one threat, other approaches to teaching thinking focus only on overall processes like decision making and problem solving, with little attention to developing students' ability with contributing skills. Moreover, those who concentrate on skills only do not always attend to skills in each of the three important categories. Some emphasize analytical skills, some creative thinking skills, and some critical thinking skills. In our view, both skills and processes should show a strong presence in a well-rounded effort to teaching thinking. And the broader the range of skills, the better. If you are working with one of the more limited approaches, you may want to supplement it.

A third important dimension of thinking also needs instructional attention. Whereas processes and skills concern what you do to think well, dispositions

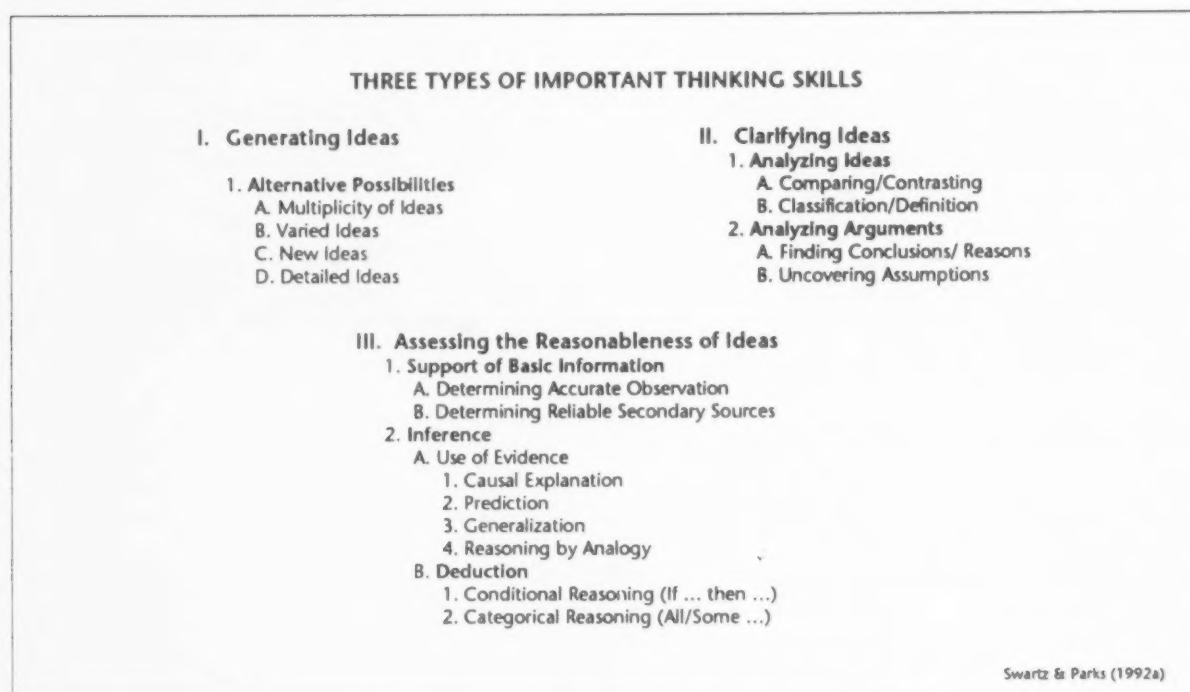


Figure 4 Three Categories of Core Skills

or attitudes concern your tendency actually to do it (cf. Ennis, 1986; Perkins, Jay, & Tishman, [in press]).

Students learn many things. However, often they do not use what they learn, except perhaps for passing the test. Why not? Perhaps they lack the motivation to use a particular skill or piece of knowledge. Or perhaps they lack the habit of putting it to work, even though they would like to. Or perhaps they do not detect occasions when it could be used. In other words, a disposition is a matter of motivation, but also of other factors such as habits and sensitivity to occasion—all these contribute to the actual deployment of better thinking. To teach thinking, we must go beyond developing skills and processes. We must also help students develop the dispositions they need to think well.

Dispositions come in all sizes. One can speak of very specific dispositions, such as the disposition to explore options carefully when you face a decision-making situation. But one can also speak of very broad dispositions, such as the disposition to hold off final judgment until you have thought carefully about all the factors—no matter whether you are

making a decision, solving a problem, or engaging in some other thinking process.

Moreover, certain broad dispositions can be seen as direct counters to the four defaults of thinking—hasty, narrow, fuzzy, and sprawling. In some curriculum development work and writing, we and our colleagues Shari Tishman, Heidi Goodrich, and Eileen Jay have highlighted four dispositions. As can be seen in Figure 5, each in turn “takes on” one of the thinking defaults and recommends an opposite pattern of behavior. Of course, the bare statement of slogans does not instill dispositions in students. However, when one keeps coming back to them and elaborates the processes and skills that go with them, they will take hold and help organize students’ behavior away from the defaults and toward better thinking.

How, in general, can we as teachers help students develop dispositions—whether overarching or more specific ones? We can model our own commitment to both as natural occasions come up in the classroom. We can show our open-mindedness, our attention to evidence, and our pursuit of op-

FOUR KEYS TO THINKING DISPOSITIONS

- ☛ Give your thinking time!
- ☛ Make your thinking adventurous and broad!
- ☛ Make your thinking clear and careful!
- ☛ Make your thinking organized!

Figure 5 Four Keys to Thinking Dispositions

tions, to inspire students' attention to them. We can also engage students in exploring when different skills and processes should be used, to build their sensitivity to appropriate occasions. And we can keep our students at the enterprise of thinking well in different content areas and on different occasions so that they develop habits of thinking well.

Basic #4. *The development of students' thinking calls for cultivating their (a) skills, (b) processes, and (c) dispositions concerning better thinking. A well-rounded approach addresses a diversity of all three.*

The Importance of Explicitness

Research suggests that thinking skills, processes, and dispositions are best treated explicitly in the classroom—spelled out, talked about, made conscious. This means that teachers should commit classroom time to focusing on thinking—defaults, better patterns of thinking, strategies, standards of judgment, ways to plan and direct thinking, and so on. Stand-alone courses, which involve the teaching of thinking, always have taken this approach. We urge that when teachers infuse thinking into their content instruction that they also attend to thinking with the same explicitness.

How? Lecturing students about thinking is the least desirable way. Rather, teachers should employ a common organizing vocabulary of thinking skills, processes, and dispositions (such as *making decisions*, and *considering options*). In the well-known article "Do You Speak Cogitare?" Arthur Costa shows how the ordinary language of the classroom can be transformed to elevate the level of students' thinking (1991). Such moves take advantage of the

verbal thinking organizers already a part of the English language. But one can go further. To what standards should we hold our predictions? What steps might we take to make a well-considered decision? Explicit verbal and graphic thinking organizers that go beyond the resources of everyday English answer such questions by expressing steps, standards, and other elements of a thinking skill, process, or disposition (Black & Black, 1990; Jones, Pierce, & Hunter, 1988-1989; McTighe & Lyman, 1988).

This does not mean that teachers must necessarily teach thinking organizers directly to students. An inductive approach is also possible. Teachers can guide students in developing their own thinking organizers. For example, teachers can engage students in thinking about decision making, identifying problematic aspects of decision making, and creating a graphic organizer for the process. Whether organizers are taught or drawn from students, explicitness is key.

For instance, the sample lesson on the extinction of dinosaurs makes explicit what skillful causal explanation involves. The teacher discusses causal explanation at the outset, using terms like *possible cause* and *looking for evidence*. Later in the lesson, the instructor guides the students through a well-organized process supported by a graphic organizer. As the students articulate a map for the thinking they did, they make aspects of causal reasoning explicit again to themselves.

Earlier, we contrasted infusion with teaching for thinking, which simply emphasizes experiences of better thinking during content instruction. Explicit

attention is the key difference. It is good to ask challenging content-oriented questions that engage students in deeper thinking than they would otherwise display. But it is better to give thinking explicit attention. Only then can one reasonably expect students to understand and appreciate the enterprise of better thinking and make efforts to put to use what they have learned about better thinking in many settings.

Basic #5. *Explicit attention to thinking during content instruction (via verbal and graphic thinking organizers, discussion, reflection, and so on) makes the crucial difference between just giving students experiences of better thinking and empowering them as aware users of better thinking practices across diverse settings.*

Attention to Metacognition

Most of the power we human beings wield over our environment comes from our ability to *think about the world*—to invent, solve problems, make reflective decisions, and so on. By analogy, much of our power to direct our own thinking, the internal world of our minds, would flow from our ability to *think about our thinking*. Psychology has a word for this process: *metacognition*.

In the context of teaching thinking, *metacognition* simply means thinking about your own thinking (Swartz, 1989). (In some technical psychological contexts it takes on slightly broader meanings.) For instance, when you ask yourself, "How well did I really handle that decision?" you are asking yourself a metacognitive question. You are setting out to think about your own thinking. When you sit down to tackle an assignment and ask yourself, "Now just how am I going to approach these problems?" you are again asking yourself a metacognitive question. You are planning in advance what strategy to use with the assignment.

Many people mix up metacognition with other kinds of thinking. However, the query, "Am I thinking about my own thinking?" proves a reliable key to sorting out true metacognition. For example, suppose Mirabelle says to herself, "I don't like the way I ended that short story." Is she thinking about her own thinking? No. She's thinking about an external product, the short story. That is

not metacognition. In contrast, suppose Mirabelle says to herself: "I settled on the ending of my short story too quickly. I should have given it more thought." Is she thinking about her own thinking? Yes. She is noting how she reached a conclusion. That is metacognition.

Metacognition is supremely important to the cultivation of good thinking. Through metacognition, people become aware of their usual thinking practices and gain the perspective they need to fine-tune or even radically revise those practices. How this works becomes clearer if we distinguish four degrees of metacognition, a kind of ladder of metacognition with the most powerful variety at the top (Swartz & Perkins, 1990).

- *The bottom rung: Tacit use.* Most often, people make use of different kinds of thinking—seeking evidence, imagining options, criticizing arguments—without any awareness. They just do it. This involves no metacognition at all.
- *The second rung: Aware use.* Sometimes, people use different kinds of thinking with more awareness, especially if they have participated in some instruction about good thinking practices. They are sometimes aware: "Now I'm making a decision. Now I'm finding evidence. Now I'm inventing ideas." Such awareness is thinking about one's thinking to only a limited degree, just categorizing and labeling.
- *The third rung: Strategic use.* Sometimes people deliberately deploy thinking organizers to guide their thinking. For instance, they say: "This is an important decision. I'm going to brainstorm a pile of options to give me some real choices. And I'll have to think out the consequences for options that look good really carefully." Such deliberate, strategic self-instructions go beyond labeling and categorizing. They involve thinking about one's thinking in order to direct it.
- *The top rung: Reflective use.* Occasionally, people think about their own thinking and the thinking organizers they use to critically assess and creatively revise their practices: "You know, when I make decisions, I don't of-

ten stretch my mind far. Let me see if I can get beyond the obvious options and find some better ones." Such episodes involve thinking about thinking in the richest sense, not just labeling and categorizing, nor even just directing, but rather examining and reinventing how one thinks.

The ladder of metacognition provides a telling reminder that there are different degrees of metacognition. Many efforts to teach thinking pay some attention to metacognition. Often it is the second rung, simply a matter of categorizing and labeling, or even the third rung, emphasizing good choice and careful following of thinking organizers. But rarely does the top rung figure in instruction. Rarely are learners encouraged to think about their thinking critically in different contexts, to size it up, and to redesign it. In our view, a principal challenge in the teaching of thinking involves lifting students to the top rung, reflective use of different kinds of thinking.

What is this like? For example, earlier in the article we invited readers to think about some recent decisions they made that did not work out well and analyze what went wrong. This is top-rung metacognition, thinking about your own thinking in a critical way. The same activity can be done with youngsters in a classroom.

For another example, notice how metacognitive activities appear in the infusion lesson on the dinosaurs. The lesson asks students to map out explicitly how they thought about the causes of the extinction of the dinosaurs, what they did first, and what next. Perhaps with help they would say that first they thought about possible causes, then possible evidence, and so on. Next, students compare this way of thinking about causes to their ordinary practices. They can discuss which is better, why, and when. Such episodes of critically evaluating the way they think are top-rung or reflective instances of metacognition.

As these examples illustrate, building metacognition into the teaching of thinking can be done readily enough. It's mostly a matter of making time in a lesson and taking some pains so some of that time serves top-rung, reflective metacognition. The gains in students' awareness of and thoughtful con-

trol over their own thinking and learning are well worth the investment. In summary:

Basic #6. *Developing learners' metacognition is an important facet of teaching thinking. It is especially desirable to cultivate top-rung metacognition—critical examination and creative revision of one's own thinking practices.*

Teaching for Transfer

One of the most important but neglected general goals of education is transfer of learning. Transfer, a term from the psychology of learning, occurs when students learn something in one context and apply it in another significantly different context (for a more developed explanation, see Perkins & Salomon, 1987). For example, when moving from one to another house, you might rent a small truck. You find that you can drive it well enough because of your experience driving cars—transfer from car to truck driving. For another example, when you use math skills acquired in the classroom on your income tax form, that is transfer. For another, if you are a chess buff and find opportunities to apply principles of chess—like "take control of the center"—to politics or business, that is transfer. As these examples make plain, some transfers reach further than others. The truck situation is relatively close to the car situation, a case of "near transfer," but politics and business are quite different from chess, a case of "far transfer."

Why is transfer so important to educators? For two reasons. First of all, the impact of education depends on transfer. We do not instruct students in mathematics so they can perform well on math quizzes, but so that they can use mathematics on income tax forms, in the supermarket, for keeping household accounts, and for pursuing professions in accounting, engineering, or science. We do not instruct students in history so they can pass the history quiz, but rather so they will read about current events with more savvy, vote with a deeper sense of the democratic tradition, and display sensitivity to the social forces around them.

The second reason is this: Research shows that transfer cannot be taken for granted. Often, students do not display the kinds of transfer we would

like to see. They do not apply their mathematical or historical knowledge to later studies or to situations outside the classroom. In most classroom settings, it is taken for granted that students make the appropriate transfer of what they are learning. But for many topics and skills, transfer does not occur.

This is a major problem for education in general and for the teaching of thinking specifically (Swartz, 1987). Just as students often do not transfer content knowledge, they often do not transfer ways of thinking that they have learned in a particular class. What can be done? Here, research is encouraging. Certain studies show that we can get the transfer we want if we teach for transfer. Although transfer does not happen automatically, if instruction includes specific components designed to foster transfer, then students display much more transfer of learning.

It's useful to characterize two general approaches to teaching for transfer: *hugging* and *bridging* (Perkins & Salomon, 1986; Fogarty, Perkins, & Barell, 1991). The basic idea of *hugging* is to make the instruction as much like the diverse potential applications as possible, including in the instruction samples or simulations of applications. Thus, the instruction "hugs" the envisioned applications as much as possible.

In contrast, *bridging* does not involve students' direct experience with possible applications. Rather, with the guidance of the teacher, students make generalizations about what they are learning, anticipate possible applications, and compare different circumstances analytically in a wide-ranging fashion. Thus, bridging is analytical and conceptual, while hugging is experiential. Both are useful ways of teaching for transfer, and both can be used together.

More concretely, what can be done to teach for the transfer of better ways of thinking? The first rule is: Set aside time to teach for transfer. As to using that time, notice how the dinosaur lesson handles transfer. It asks students to apply the same strategy to an endangered species; calls for them to analyze some school concern, such as noise in the cafeteria, to determine its causes; and plans ahead to employ the same strategy again later in the term to examine the causes of the increase in the population of mammals during the Mesozoic Era. All of these are examples of hug-

ging; in all cases the students directly practice other applications of the process.

For another example, suppose that your students learn something about decision making in the context of looking at Harry Truman's decision to use the atomic bomb to end World War II (Swartz & Parks, 1992). To teach for transfer, you might:

- *Do a similar exercise with a different example.* For instance, you might engage your students in working through the decision of Southern politicians to secede from the Union. Such an application helps students generalize the decision-making perspective introduced with the Truman example. It is a form of hugging, a direct experience with other examples.
- *Compare and contrast with personal decisions.* You might ask your students to choose personal decisions they have made and compare the process of making those decisions with how you all, in class, rethought Truman's decision. This is bridging, an analytical compare-and-contrast exercise.
- *Have your students keep decision diaries.* You might ask your students to keep "decision diaries" for three or four weeks. They work through some personal decisions in their diaries, keeping in mind some of the decision-making principles they are learning. In their diaries, they also compare and contrast those decisions with historical decisions you are studying at the same time. This involves both hugging and bridging—hugging in directly working through personal decisions and bridging through the analytical comparison and contrast.

Some teachers will find it comfortable to teach for transfer with tactics very like those in these examples. Others with different agendas can devise other hugging and bridging maneuvers to help youngsters transfer what they are learning. Most important is the principle involved:

Basic #7. *Teaching for transfer of better ways of thinking is an important part of the teaching of thinking. This means allocating specific time to engage learners in actually experiencing wider applications (hugging) and generalizing and thinking analytically about possible applications (bridging).*

BUILDING AN INFUSION PROGRAM

Beware Token Investment

Commonly, efforts to infuse thinking into subject matter instruction are sporadic. This is understandable, in that teachers' lives are horrendously busy, and they have all too many agendas to serve. At the same time, both common sense and some research suggest that a minimalist approach to infusing thinking into subject matter learning does not achieve very much, probably nothing. When teachers who teach a class four or five times a week only include a thinking activity once a week or once every two weeks for fifteen minutes or a half hour, there is likely to be no long-term impact whatsoever, although often the activity itself goes very well.

Probably, teachers should do something every day, even if briefly, for the initiative to be worthwhile. Something, but what? In our view, it is not necessary to focus on a key process, such as causal reasoning, with fully elaborated lesson after lesson, like the one about dinosaurs. One to three lessons with such step-by-step guidance are enough for a specific process or skill—provided that they are followed up with regular reinforcement through transfer examples. For instance, one would ask students to think through other issues requiring causal reasoning in a more self-guiding way. Such applications often have to begin with the students reminding themselves of the strategy they used before, the teacher helping only as necessary. It is important to replace teachers' external guidance with students' internal guidance as they gain more experience.

Besides frequency, diversity is important too. The same skills and processes should be introduced in a number of different subject areas and reinforced by teachers working from the same thinking frameworks across the curriculum and grade levels. This provides repeated practice and fosters transfer. And there is another reason as well: Part of the aim in teaching thinking is to modify student dispositions or attitudes so that they appreciate the value of good thinking. Showing that we value it enough to give it a prominent role across the whole curriculum supports the development of

these dispositions. This is a short but very important basic. To sum it up:

Basic #8. *Attention to thinking in content instruction needs to be fairly frequent to (a) build students' skills and insights and (b) systematically deepen content understanding. Don't shortchange it!*

The Need for Continuing Staff Development

Gaining facility in creating and teaching subject matter lessons infused with the teaching of thinking is not very difficult. However, it cannot be accomplished overnight. Four basic elements are involved:

- Work from a clear conception of the kind of thinking that you want to teach your students. Have skills, processes, dispositions, and relevant thinking organizers in mind.
- Find natural points of opportunity in the curriculum you teach, places that invite attention to the kind of thinking in question.
- Structure your lessons to introduce (or, in an inductive approach, elicit from students) the thinking skills, processes, and dispositions explicitly through thinking organizers.
- Help your students reflect on the thinking they are doing (metacognition) and give them plenty of practice in using that kind of thinking in diverse contexts and in reflecting on how it might apply elsewhere (transfer).

Each of these points is best accomplished in the context of ongoing staff development programs for groups of teachers. Although virtually all teachers already do some things to cultivate students' thinking, most have not received any formal introduction to the teaching of thinking. Time is needed to become familiar with the variety of thinking skills and processes that are important in good thinking and to find ways to work them into the curriculum. There is no "quick fix." Going to a single workshop will not impart facility in teaching thinking well. (For a general practical perspective on the problems of teacher development and school change, see Fullan, 1991.)

Multiple exposures are important. But, beyond that, effective staff development requires more di-

rect learning opportunities, typically through individualized coaching sessions. Research on staff development strongly supports this. Coaching sessions should focus on specific lessons that teachers either have designed or are in the process of designing. The coach can sit in on a class and discuss what happens afterward with the teacher. Or the coach can meet with a teacher before the lesson is taught to help work through the lesson design. The coach need not be an outside consultant, but may well be a teacher in the same school with more background to draw on. Whatever the details, the coaching process should focus directly on classroom implementation of general ideas obtained through workshops or other means.

For instance, a workshop might introduce a group of teachers to causal reasoning, with the dinosaur lesson as an example. The teachers are asked to design causal reasoning lessons relevant to their own content. A few days later, the workshop presenter or a teacher with prior experience in such instruction might discuss the designs with each teacher individually. One teacher might have designed a causal explanation in social studies on the causes of the Civil War. Another might bring one on what caused feuding in "The Pushcart War." The discussion often yields major changes in the lesson and builds teachers' confidence in their efforts to infuse thinking into their content instruction.

There is no substitute for this kind of careful work on lesson design as you build an infusion program for

a classroom or a whole school. We have many models of this process already. The best "thinking" schools utilize a variety of support structures for such ongoing staff development programs. These range from relief time for inservice programs to peer coaching arrangements. Teachers work collaboratively to ensure a common focus across classes and subject matter. Striving to cultivate students' thinking, they find themselves engaged in thinking and rethinking their approaches to teaching and their school's curriculum. The school becomes a setting that values and fosters both students' and teachers' thinking.

Basic #9. *The infusion of thinking into content area instruction is not a "quick fix" accomplishable by a single workshop. Schools and teachers need to commit themselves to a continuing process of thoughtful staff development (much of which may be handled internally by the school) to undertake successfully this profound and exciting qualitative change in the learning experiences of youngsters.*

Arthur Costa constantly reminds us that the better thinking practices we stress in classrooms for our students' sake should permeate the entire atmosphere of the school, inspiring teachers and administrators (1991). Schools like this are "homes for the mind." We believe that everyone in the long run can afford this sort of home. Indeed, we as a society cannot afford not to afford them. In the years to come, the expanding art and craft of infusion will help create such schools far and wide.

REFERENCES

- Barman, C., DiSpezio, M., Guthrie, V., Leyden, M., Mercier, S., & Ostlund, K. (1989). *Addison-Wesley Science*. Menlo Park, CA: Addison-Wesley.
- Baron, J. B., & Sternberg, R. S. (Eds.). (1986). *Teaching thinking skills: Theory and practice*. New York: W. H. Freeman.
- Black, H., & Black, S. P. (1990). *Organizing thinking*. Pacific Grove, CA: Midwest Publications.
- Brandt, R. (1984). Editorial. *Educational Leadership*, 41(1), 3.
- Costa, A. (1991a). Teaching, for, of, and about thinking. In A. Costa (Ed.), *Developing minds: A resource book for teaching thinking, revised edition* (Vol. 1) (p. 31-34). Alexandria, VA: Association for Supervision and Curriculum Development.

- Costa, A. (1991b). *The school as a home for the mind*. Palatine, IL: Skylight Publishing.
- Ennis, R. H. (1986). A taxonomy of critical thinking dispositions and abilities. In J. B. Baron & R. S. Sternberg (Eds.), *Teaching thinking skills: Theory and practice*, (p. 9-26). New York: W. H. Freeman.
- Fogarty, R., Perkins, D. N., & Barell, J. (1991). *How to teach for transfer*. Palatine, IL: Skylight Publishing.
- Fullan, M. G. (1991). *The new meaning of educational change*. New York: Teachers College Press.
- Jones, B. F., Pierce, J., & Hunter, B. (1988-89). Teaching students to construct graphic representations. *Educational Leadership*, 46(4), 20-25.
- McTighe, J., & Lyman, F. T. (1988). Cueing thinking in the classroom: The promise of theory-embedded tools. *Educational Leadership*, 45(7), 18-24.
- Mirman, J., & Tishman, S. (1988). Infusing thinking through "connections." *Educational Leadership*, 45(7), 64-65.
- Nickerson, R., Perkins, D. N., & Smith, E. (1985). *The teaching of thinking*. Hillsdale, NJ: Lawrence Erlbaum.
- Perkins, D. N. (1992). *Smart schools*. New York: The Free Press.
- Perkins, D. N. (1987). Myth and method in teaching thinking. *Teaching Thinking and Problem Solving*, 9(2), 1-2, 8-9.
- Perkins, D. N. (1986a). *Knowledge as design*. Hillsdale, NJ: Lawrence Erlbaum.
- Perkins, D. N. (1986b). Thinking frames. *Educational Leadership*, 43(8), 4-10.
- Perkins, D. N. (1986c). Thinking frames: An integrative perspective on teaching cognitive skills. In J. B. Baron & R. S. Sternberg (Eds.), *Teaching thinking skills: Theory and practice*, (p. 41-61). New York: W. H. Freeman.
- Perkins, D. N., Goodrich, H., Mirman, J., & Tishman, S. (in press). *Connections*. Menlo Park, CA: Addison-Wesley.
- Perkins, D. N., & Salomon, G. (1989). Are cognitive skills context bound? *Educational Researcher* 18(1), 16-25.
- Perkins, D. N., & Salomon, G. (1988). Teaching for transfer. *Educational Leadership*, 46(1), 22-32.
- Perkins, D. N., Jay, E., & Tishman, S. (in press). *Beyond abilities: A dispositional theory of thinking*. Merrill-Palmer Quarterly.
- Swartz, R. (1991a). Structured teaching for critical thinking and reasoning in standard subject-area instruction. In J. Voss, D. Perkins & J. Segal (Eds.), *Informal reasoning and education*, (p. 414-450). Hillsdale, NJ: Erlbaum.
- Swartz, R. (1991b). Infusing the teaching of critical thinking into content instruction. In A. Costa (Ed.), *Developing minds: A resource book for teaching thinking, revised edition* (Vol. 1), (p. 177-184). Alexandria, VA: Association for Supervision and Curriculum Development.
- Swartz, R. (1989). Making good thinking stick: The role of metacognition, extended practice, and teacher modeling in the teaching of thinking. In D. Topping, D. Crowell, & V. Kobayashi (Eds.), *Thinking across cultures: The third international conference*, (p. 417-436). Hillsdale, NJ: Erlbaum.
- Swartz, R. (1987). Critical thinking, the curriculum, and the problem of transfer. In D. Perkins, J. Bishop, & J. Lochhead (Eds.), (p. 261-284). *Thinking: The second international conference*. Hillsdale, NJ: Erlbaum.
- Swartz, R., & Parks, S. (1992a). *Infusing critical and creative thinking into elementary instruction: A lesson design handbook*. Pacific Grove, CA: Midwest Publications.
- Swartz, R., & Parks, S. (1992b). *Infusing critical and creative thinking into secondary instruction: A lesson design handbook*. Pacific Grove, CA: Midwest Publications.
- Swartz, R. J., & Perkins, D. N. (1990). *Teaching thinking: Issues and approaches*. Pacific Grove, CA: Midwest Publications.
- Tishman, S. (1991). Connections. In A. Costa (Ed.), *Developing minds: Programs for teaching thinking, revised edition* (Vol. 2), (p. 69-72). Alexandria, VA: Association for Supervision and Curriculum Development.

MIND TOOLS FOR MATTERS OF THE MIND

Jay McTighe and Frank T. Lyman

With feigned earnestness, the first grade teacher informs the class that today will be an "exactly right day" during which no one will make any mistakes. Noting that the children accept this plan as reasonable, she proceeds to write a story on the board, writing down only the words "I" and "the." When asked what they think of this story, the children are baffled and amused. The teacher explains that "I" and "the" are the only two words she knows how to spell correctly. They end up telling the teacher it is better to make mistakes than to write only two words down. The teacher then asks them whether there are other times when it is O.K. to make a mistake, and writes on the board: What is good about making a mistake? She then tells them that they will make a theory about the good effects of making mistakes. As she does this, she gives hand signal cues for cause/effect and evaluation, and sets thinking wheel arrows on the symbols for these two basic types of thinking.

Setting a wall chart indicator on "think" she asks the children to think of a time when they made a mistake. After ten seconds, she sets the indicator on "pair" and the children tell each other about their mistakes. Volunteers then "share" examples of mistakes with the whole class and the teacher lists them on a memory chart for reference later. Following "think" and "share" cues, the children recall other mistakes made by familiar literary characters, such as Pinocchio and the three little pigs, and discuss what these characters learned from their mistakes. Going through the think-pair-share cycle again, the students

pick certain listed mistakes and discuss in pairs how making these mistakes might help the children in some way.

After the second pairing, the teacher again moves the indicator to "share" and places the students' answers on a web-shaped graphic organizer. The students are amazed at the ways a mistake can help them. Later, the teacher creates a wheel-shaped organizer that illustrates general ways mistakes can be helpful and specific examples to match these effects. The wheel is then laminated and placed on the wall as a reference. (See Figure 1.)

* * *

Both teacher and students are visibly bothered by the incessant squabbles inside and outside the seventh grade social studies classroom. The teacher decides to enlist the students' help in restoring peace and places three web-shaped graphic organizers on chart paper: one for causes, one for effects, and one for prevention/resolution of conflict. Before working on these maps, students, individually and with a partner, generate all the examples of conflict they can. To help with this recall, the teacher posts a list of contexts, such as book titles, movie titles, historical events, and life settings.

Individually, students then list and share examples of conflict with the class. Once a list is compiled, the teacher asks each student to choose at least five examples and place the causes of each conflict on a personal web-shaped organizer. After the students have generated causes and sought common ones with a partner, they share the most frequently identified causes with the class. The teacher places the most common of these on the first graphic organizer, titled "causes."

The process is repeated for effects of conflicts and for possible prevention measures or resolutions. By the end of two class periods, the students have formed a theory of cause, effect, prevention, and resolution of conflict. They have also investigated the relationship between certain causes of conflict and measures for prevention or resolution. The teacher takes the information and, with the help of four students, designs a large concentric wheel organizer. The organizer is laminated and placed on the wall as a guide for prevention and resolution of classroom conflict. The graphic organizer also serves as a theory template to help students examine and understand the historical conflicts studied in class.

When the wheel is first displayed, the teacher uses think-pair-share and asks the students to identify the types of thinking they used to create their theory. For this identification they refer to the question-response cues on the "thinking matrix" (thinktrix). Symbols for each type of thinking are then attached to the appropriate parts of the wheel. The teacher refers to this analytical and labeling process as "shared metacognition."

* * *

At the beginning of the period, the high school literature teacher targets the objective of the day – to analyze Willie Loman, the play's central character. He then distributes copies of the character map, giving each student approximately five minutes to develop a preliminary character sketch by making notes on the graphic organizer. Students work on this activity individually while referring to their anthologies.

Following their individual thinking time, the students shift to pre-assigned cooperative learning groups of four students each. Using their individual maps as a starting point, the group members engage in a discussion of the character traits of Willie Loman with the goal of producing a group character map. For the next twenty minutes, the classroom is filled with lively conversation as groups reach consensus and prepare a large map on chart paper.

Upon completion, each group tapes its chart paper map to a chalkboard or wall. As a result of their own involvement in the character analysis, students are eager to see the ways in which others interpreted the character. The teacher capitalizes on this heightened interest by concluding the period with a "gallery walk" around the classroom to view the completed maps. This brief tour provides students with a glimpse of the analyses of other groups in preparation for tomorrow's group presentations. The students leave the room with Willie Loman on their minds.

What characteristics do the preceding scenarios share? At least three common elements may be noted. First, in each situation, the teacher has consciously applied specific, research-based, instructional techniques for actively involving students in constructing meaning—for example, developing a theory of conflict or analyzing a literary character. Second, the learning activities are facilitated by cognitive tools, which are tangible devices that assist thinking in the classroom—for example, the thinking matrix and the character map. Finally, classroom actions and interactions are cued through a mutually understood system, such as thinking symbols and signals for think-pair-share. The focus for this chapter is on these "theory-embedded tools" and their associated cues.

Throughout history, human progress has been propelled by the development and utilization of tools. Tools such as the wheel, the bow and arrow,

the windmill, the telegraph, the microscope, and the computer have greatly extended human physical and mental capabilities. Increasing knowledge provides a springboard for the development of new and more sophisticated tools.

How can this concept of tools be applied in education? A theory of tool-based instruction has been formulated by Nathaniel Gage (1974). Gage proposes that teachers use "tools of the trade"—tangible teaching/learning devices that are the material embodiment of theoretically valid teaching/learning ideas. According to Gage, such tools demonstrate four characteristics: psychological validity in which tools reflect what is known about teaching and learning; concreteness, or embodiment of the knowledge in materials and equipment; relevance, or practical value to teachers facing the daily pressures and challenges of the classroom; and differentiation by type of learning, a relationship between the type of tool and the way that a skill, concept, process, or attitude is best learned.

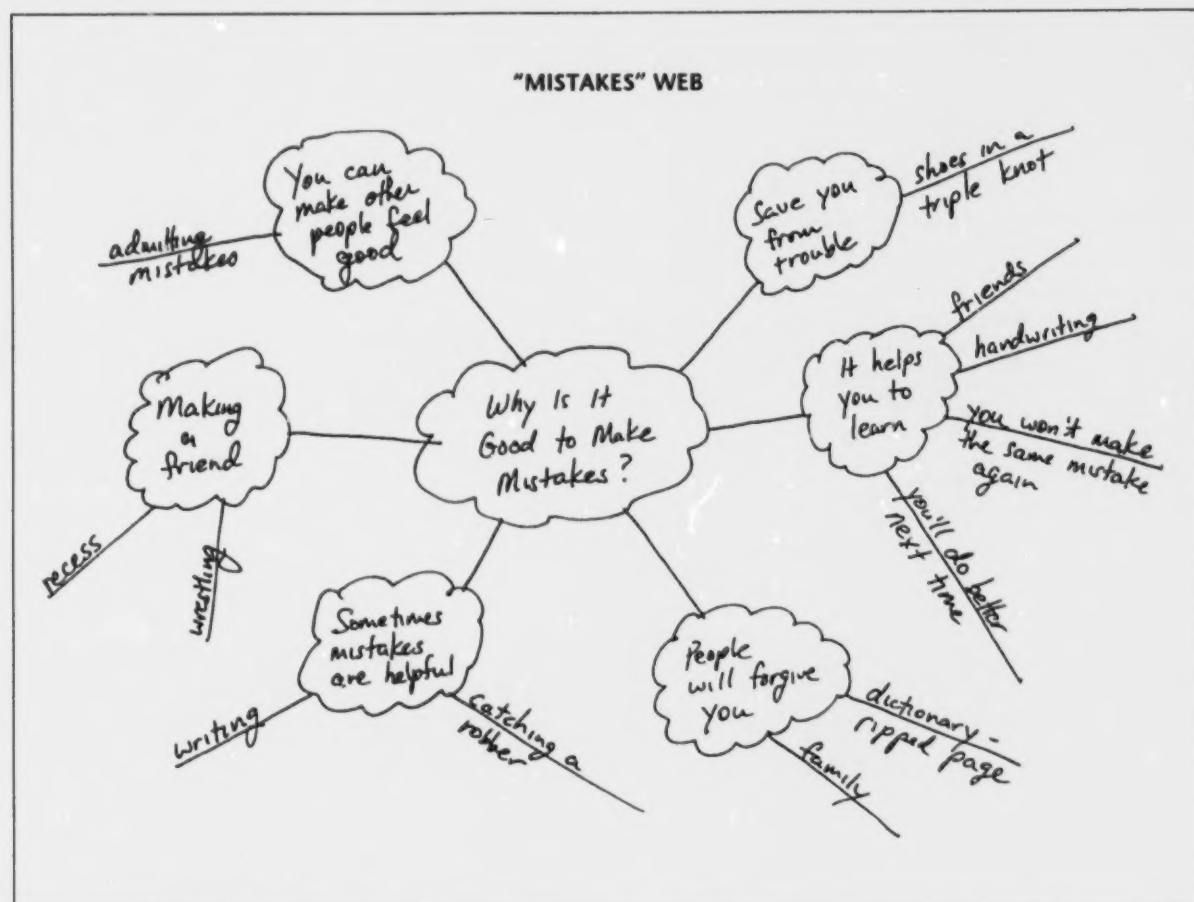


Figure 1 "Why it is Good to Make Mistakes" Web

THEORY-EMBEDDED TOOLS FOR THE "MINDS-ON" CLASSROOM

Successful classroom application demonstrates that cognitive tools provide a practical medium for blending theory and practice. The following are examples of nine theory-embedded tools and associated techniques conducive to a "minds-on" classroom, where active thinking leads to meaningful learning.

Think-Pair-Share

After the teacher asks a question, first-graders think for ten seconds and then talk in pairs as the teacher moves an arrow on a cue chart from "think" to "pair."

More than twenty years of research on "wait time" confirms the many benefits of allowing three or

more seconds of silent thinking time after a question has been posed (wait time I) as well as after a student's response (wait time II). These benefits include longer and more elaborate answers, inferences supported by evidence and logical argument, greater incidence of speculative responses, increased student participation in discussion, and improved achievement (Rowe, 1986).

Additional research confirms the effectiveness of cooperative learning. The use of various cooperative structures promotes student involvement and increases verbal interaction, resulting in positive effects on attitude and achievement (Slavin, 1981; Johnson & Johnson, 1984). The think-pair-share method (Lyman, 1989, 1981) combines the benefits of wait time and cooperative learning (Dansereau, 1986).

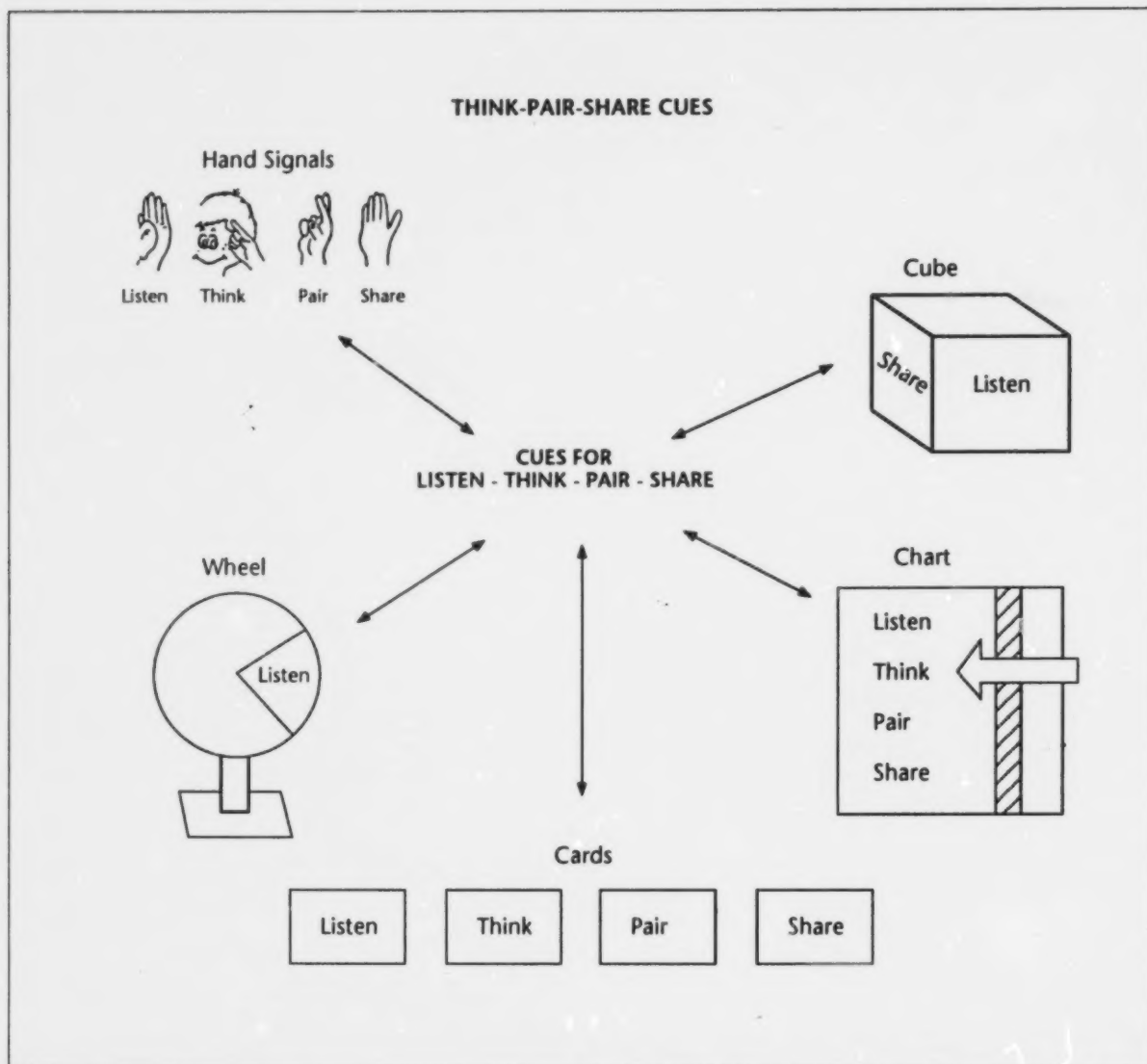


Figure 2 Think-Pair-Share Cues

Think-pair-share is a multimode discussion cycle in which students listen to a question or presentation, have time to *think* individually, talk with each other in *pairs*, and finally *share* responses with the larger group. The teacher signals students to switch from listening to *think*, *pair*, and *share* modes by using cues. (See Figure 2.)

Cueing enables teachers to manage students' thinking by combating the competitiveness, impulsivity, and passivity present in the time-worn recitation model. Both wait time I and wait time II

can be consistently achieved with think-pair-share since students raise their hands only on signal, not directly after the question or a response. Students, individually and in pairs, may write or diagram their thoughts. Other cues give scripts or options for how students are to think or work in pairs. For instance, teachers may cue them to reach consensus, engage in problem solving, or assume the role of devil's advocate. (See Figure 3.)

The overall effect of these coordinated elements is a concrete, valid, and practical system made man-

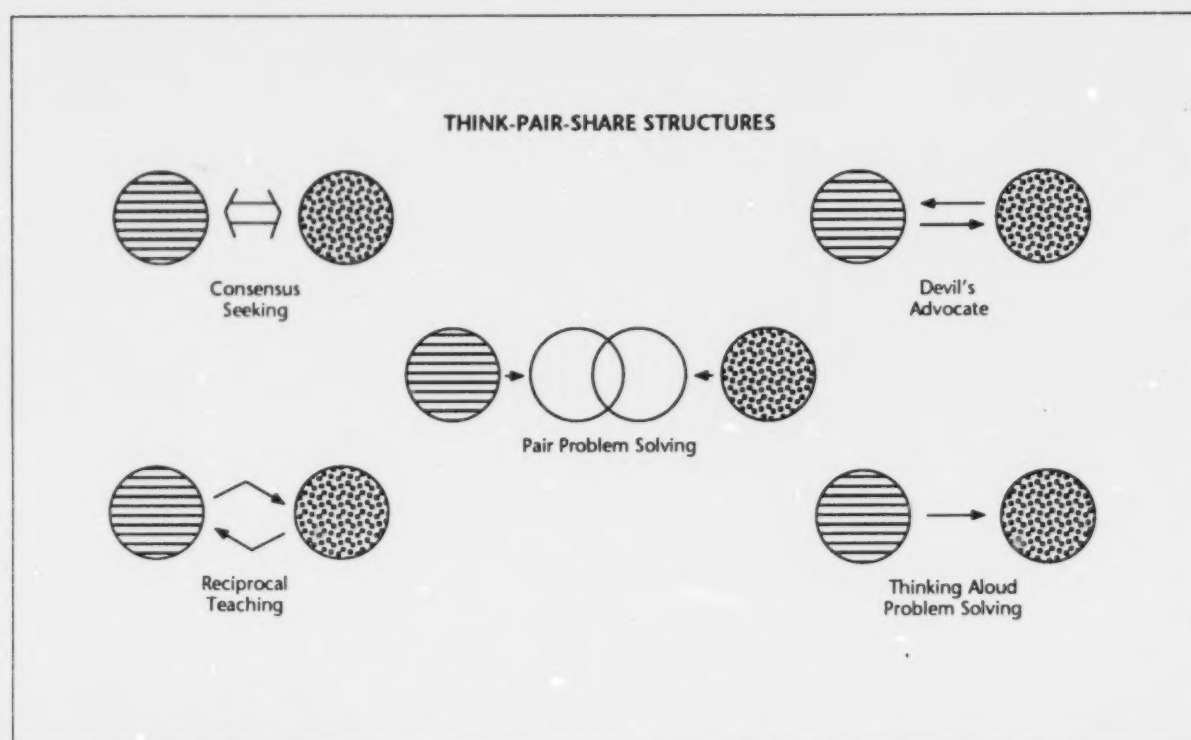


Figure 3 Think-Pair-Share Structures

ageable, and thereby acceptable to teachers, by cueing.

Questioning/Discussion Strategies Bookmark

During a classroom discussion of the limits of First Amendment rights, a high school social studies teacher glances at a laminated bookmark he's holding and assumes the role of devil's advocate in response to students' comments.

More than 2,000 years ago, Socrates demonstrated the power of questioning to stimulate student thinking about content. Educators today know that the way a teacher structures a question influences the nature of the thinking required to respond. We also know that follow-up strategies, such as asking for elaboration, influence the degree and quality of classroom discussion. Despite this knowledge, however, Goodlad (1985) reports that most classroom questions require only factual responses and that, in general, students are not involved in thought-provoking discussions.

Teachers can integrate effective questioning and discussion strategies into their daily repertoires by referring to a "cueing bookmark" (McTighe, 1985), which features question starters on one side and discussion strategies on the other. (See Figure 4.) During classroom discussion, the bookmark reminds teachers to use these advantageous strategies.

Thinking Matrix

After looking at a thinking matrix game board, a fifth grade boy asks his classmate, "What caused the hero's death ... I mean, what was there about his life that made you think he had to die that way?"

In addition to learning to ask questions that promote thinking (Gall, 1970; Hare & Pulliam, 1980), teachers are recognizing a need to help students generate their own questions. Generating their own questions facilitates students' comprehension (Davey & McBride, 1986) and encourages them to focus attention, make predictions, identify relevant information, and think creatively about content.

CUEING BOOKMARK

STRATEGIES TO EXTEND
STUDENT THINKING

- Remember wait time I and II
Provide at least three seconds of thinking time after a question and after a response.
- Utilize think-pair-share
Allow individual thinking time, discussion with a partner, and then open up for class discussion.
- Ask follow-up questions
"Why? Do you agree? Can you elaborate? Tell me more. Can you give an example?"
- Withhold judgment
Respond to student answers in a nonevaluative fashion.
- Ask for summary to promote active listening
"Could you please summarize John's point?"
- Survey the class
"How many people agree with the author's point of view?" (thumbs up, thumbs down)
- Allow for student calling
"Richard, will you please call on someone else to respond?"
- Play devil's advocate
Require students to defend their reasoning against different points of view.
- Ask students to unpack their thinking
"Describe how you arrived at your answer." (think aloud)
- Call on students randomly
Avoid the pattern of only calling on those students with raised hands.
- Encourage student questioning
Let the students develop their own questions.
- Cue student responses
"There is not a single correct answer for this question. I want to consider alternatives."

Language and Learning Improvement Branch
Division of Instruction
Maryland State Department of Education

QUESTIONING FOR QUALITY
THINKING

Knowledge – Identification and recall of information

Who, what, when, where, how ____?
Describe _____.

Comprehension – Organization and selection of facts and ideas

Retell _____ in your own words.
What is the main idea of _____?

Application – Use of facts, rules, principles

How is ____ an example of ____?
How is ____ related to ____?
Why is ____ significant?

Analysis – Separation of a whole into component parts

What are the parts or features of ____?
Classify ____ according to ____.
Outline/diagram/web ____.
How does ____ compare/contrast with ____?
What evidence can you present for ____?

Synthesis – Combination of ideas to form a new whole

What would you predict/infer from ____?
What ideas can you add to ____?
How would you create/design a new ____?
What might happen if you combined ____ with ____?
What solutions would you suggest for ____?

Evaluation – Development of opinions, judgments, or decisions

Do you agree ____?
What do you think about ____?
What is most important ____?
Prioritize ____ according to ____.
How would you decide about ____?
What criteria would you use to assess ____?

Figure 4 Cueing Bookmark

The thinking matrix, or "thinktrix," is a device to aid teachers and students in generating questions and responses (Lyman, 1987). The vertical axis of the matrix contains symbols of types of thought.

The horizontal axis lists categories that give points of departure for inquiry, which vary according to the subject area. For example, using the matrix in language arts (Figure 5), teachers or students point

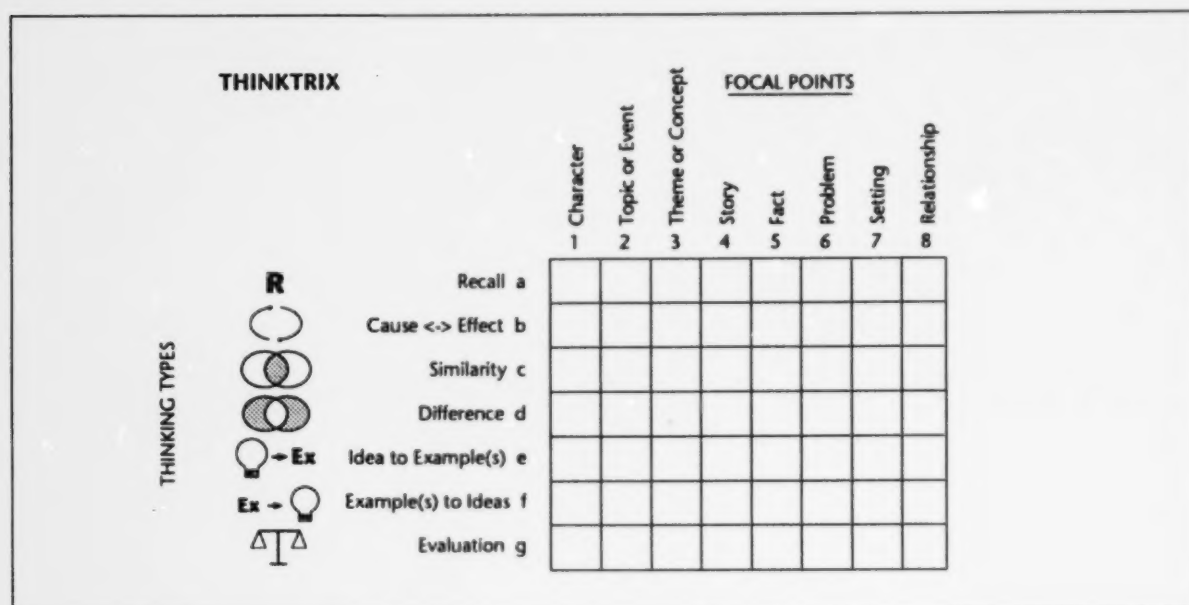


Figure 5 Thinktrix: Reading/Literature

to an intersection such as *cause/effect* and *event* or *character* and ask a question about the cause of the hero's death. In social studies (Figure 6), they could point to the intersection of *idea to example* and *concept or theory* and ask for historical examples of balance of power.

The thinktrix has many uses in the classroom. Students can analyze classroom questions or discourse, or they can create, analyze, and answer their own questions using a desk-size matrix as a game board. (See Figure 7.)

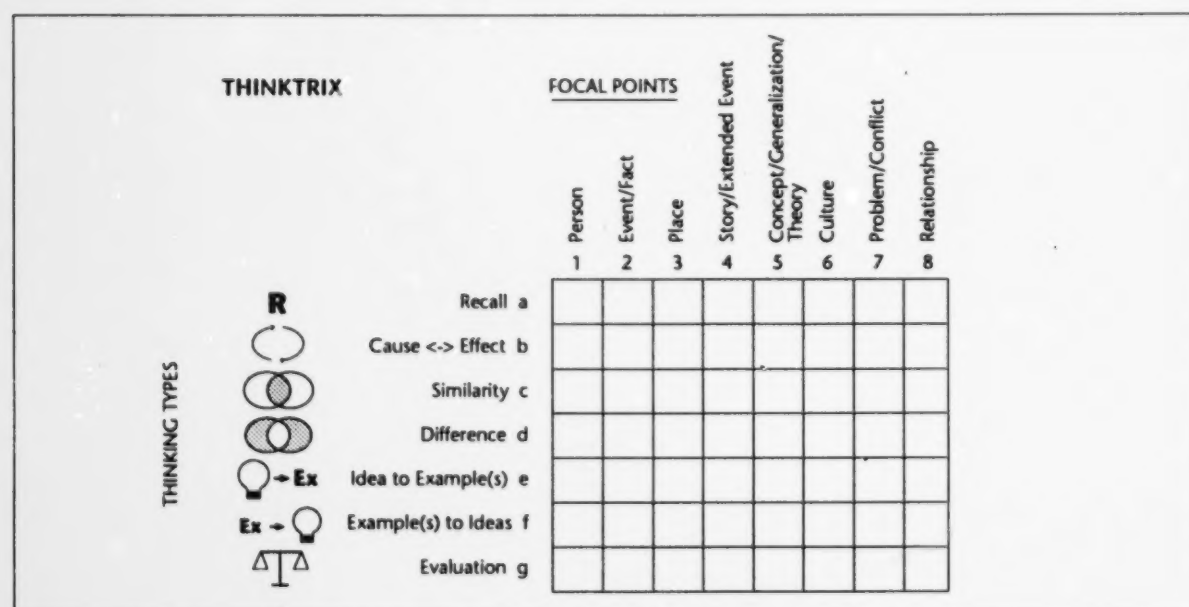


Figure 6 Thinktrix: Social Studies

THINK TRIX Language Arts	THINK TRIX Language Arts	THINK TRIX Language Arts	THINK TRIX Language Arts	THINK TRIX Language Arts	THINK TRIX Language Arts	THINK TRIX Language Arts	THINK TRIX Language Arts	THINK TRIX Language Arts
THINK TRIX Language Arts	R	Recall	Cause and Effect	Similarities	Differences	Idea to Example(s) EX →	Example(s) to Idea EX →	Evaluation
Character								Character
Event								Event
Feeling/Trait/ Theme								Feeling/Trait/ Theme
Story								Story
Setting								Setting
Problem/ Conflict								Problem/ Conflict
Author's Style								Author's Style
Relationship								Relationship
THINK TRIX Language Arts	R	Recall	Cause and Effect	Similarities	Differences	Idea to Example(s) EX →	Example(s) to Idea EX →	Evaluation

Figure 7 Thinktrix Gameboard

Using a poster-size matrix or wheel, teachers can make up their own questions, teach students how to design questions, show students how to respond to information using different thinking types, and point out the possible visual representations of each thinking type. In essence, the thinking matrix allows for shared metacognition in which teacher and students have a common framework for generating and organizing thought, as well as for reflecting on it.

Ready Reading Reference

While reading an article about sea lions in a children's magazine, a fifth-grader looks at his bookmark and creates a visual image of what he has just read.

Analysis of the differences between good and poor readers points out the importance of the strategic behaviors that good readers spontaneously employ before, during, and after their reading. For example, they concentrate on their purpose for reading, make predictions about the text, monitor their comprehension, and adjust their approach when necessary. Poor readers, on the other hand, are less mindful of such effective strategies. In fact, they tend to perceive reading as "decoding" rather than as the construction of meaning (Garner, 1980; Garner & Reis, 1981).

The ready reading reference bookmark (Kapinus, 1986) was developed to summarize knowledge about "good reader" strategies (Paris & Jacobs, 1984). The bookmark serves as a tangible instructional tool for teachers and as a concrete

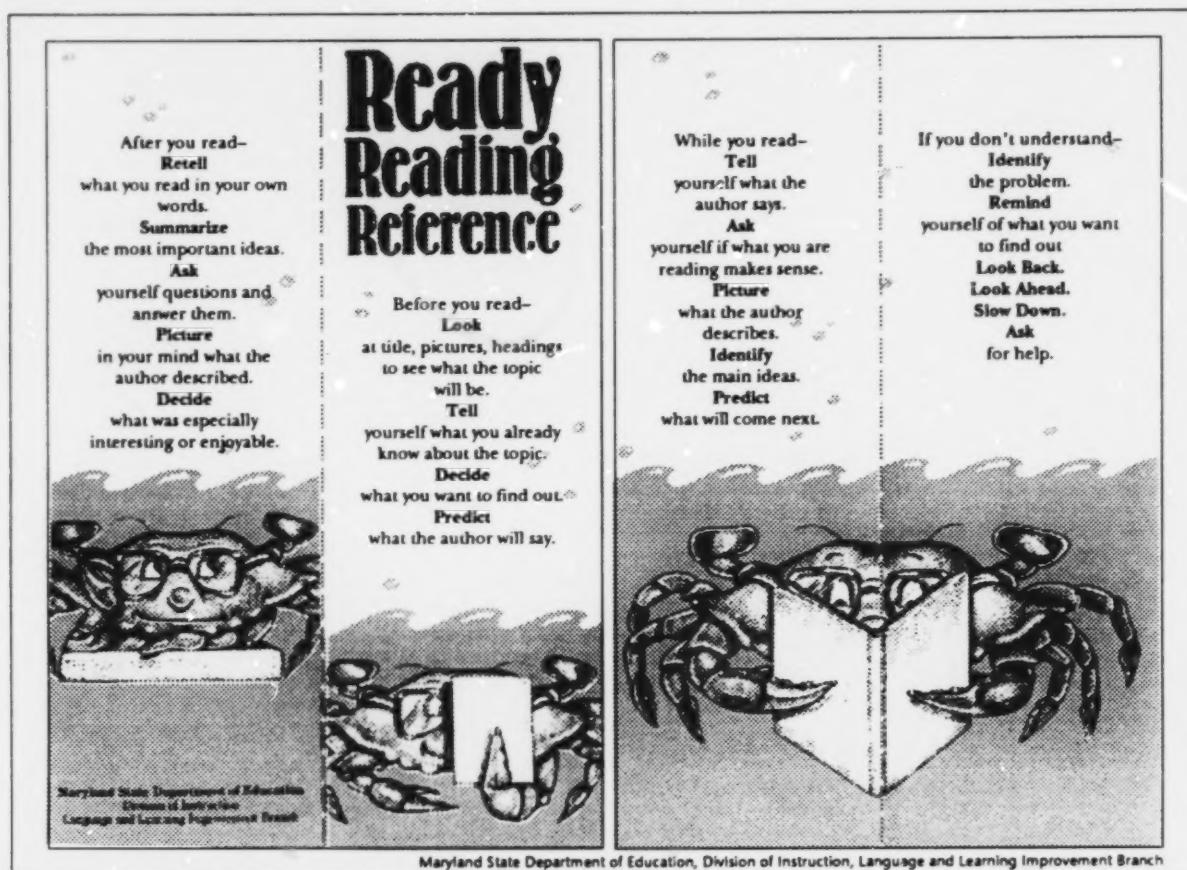


Figure 8 Ready Reading Reference Bookmark

cue for students during independent reading. (See Figure 8.)

Problem-solving Strategies Wheel

As students in an algebra II class struggle to solve a word problem, their teacher points to a poster of problem-solving strategies and suggests that they consider strategy #5 – “draw a diagram.”

Math and science teachers often experience frustration when students who demonstrate an understanding of basic facts and concepts cannot apply this knowledge to word problems. Fortunately, inquiry into the problem-solving behaviors of experts and novices has revealed important strategic distinctions for problem-solving instruction. Effective problem solvers spend time understanding a problem before attacking it. To this end, they

may create various representations or models. Expert problem solvers also report using problem-solving strategies, or heuristics, such as breaking the problem into subproblems. They also engage in metacognitive behaviors, including monitoring progress and checking the final solution (Mayer, 1983; Schoenfeld, 1979, 1980; Suydam, 1980).

Teachers who wish to improve students' problem-solving skills can spend classroom time examining the solution *process* along with the final answer; modeling their own strategic reasoning by “thinking aloud”; and providing explicit instruction in problem-solving heuristics using a tool such as the problem-solving strategies wheel (see Figure 9). Frequently found in the form of a large classroom poster, such an instructional tool is a visible cue that reminds teachers and students of the strategies of experts.

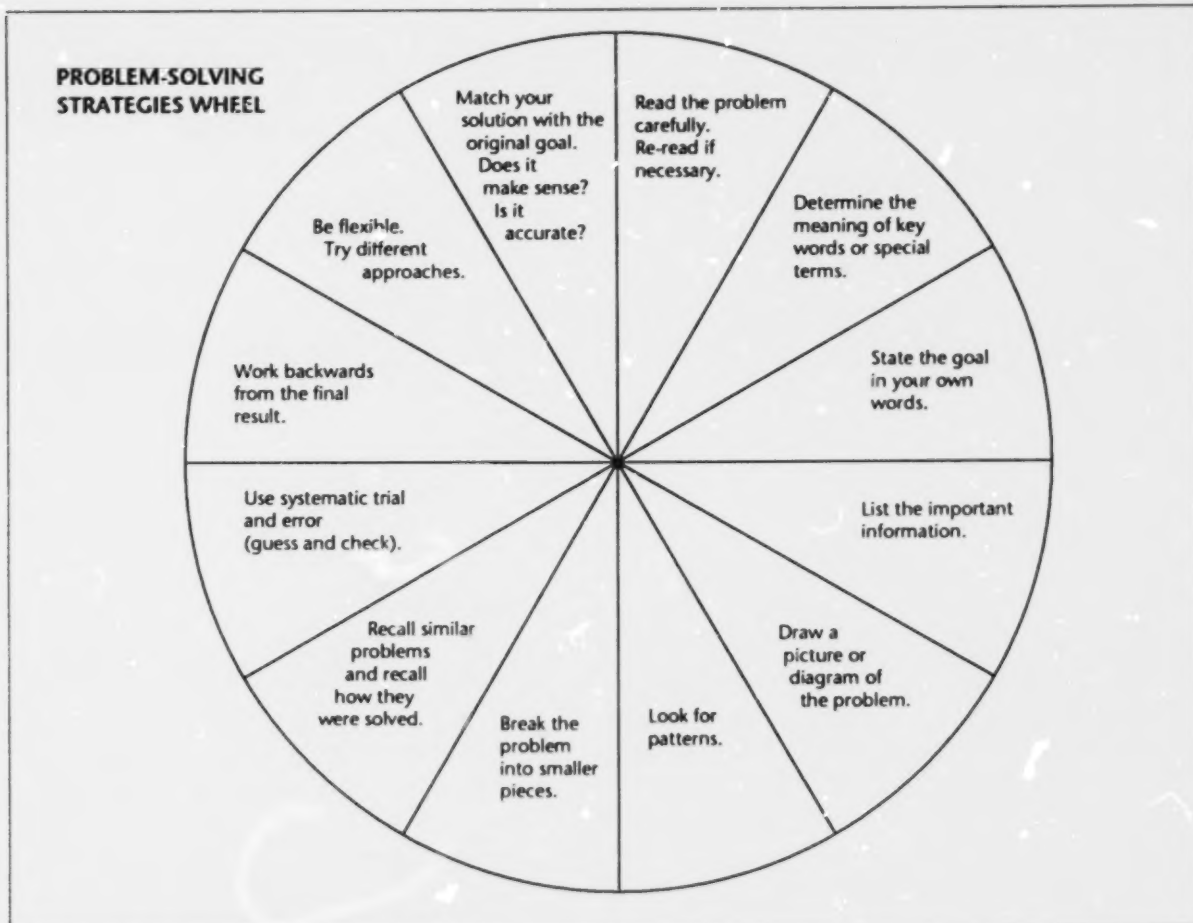


Figure 9 Problem-solving Strategies Wheel

Graphic Organizers

Upon completing a character analysis map as part of a "prewriting" activity, an eighth grader comments, "I like graphic organizers because they help me see what I'm thinking."

The ability to generate and organize ideas and information is fundamental to effective thinking and learning (Armbruster & Anderson, 1980; Jones, Amiran, & Katims, 1985). Graphic organizers provide a visual, holistic representation of facts and concepts and their relationships. They serve as effective tools for helping students and teachers

- represent abstract or implicit information in a more concrete form,
- depict relationships between facts and concepts,

- generate and organize ideas for writing,
- relate new information to prior knowledge,
- store and retrieve information, and
- assess student thinking and learning.

Graphic organizers, also called cognitive maps, are used in classrooms from kindergarten through university levels. Perhaps the most widely used design is the web. Other designs include sequence steps or chains (Figure 10), vector charts for cause and effect, story maps, analogy links, concentric wheels, flow charts for decision making and problem solving, and character maps (Figure 11). Such graphic organizers become blueprints for oral discourse and written composition, particularly when used in conjunction with think-pair-share and

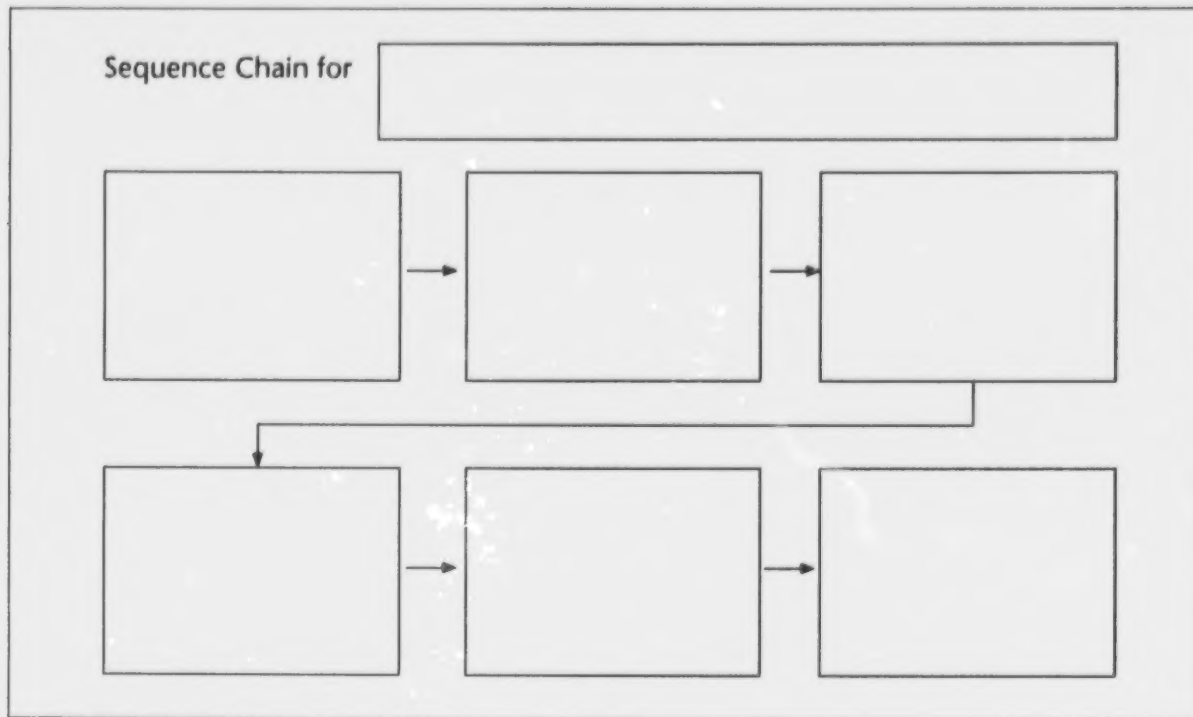


Figure 10 Sequence Chain

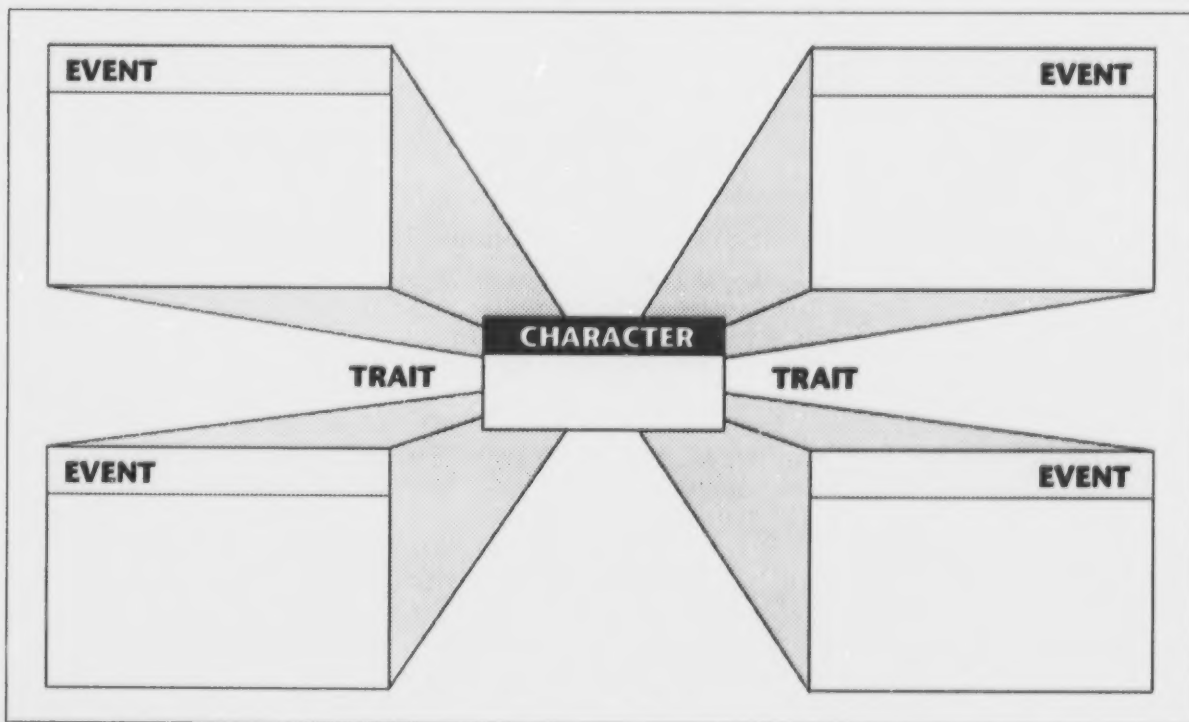


Figure 11 Character Map

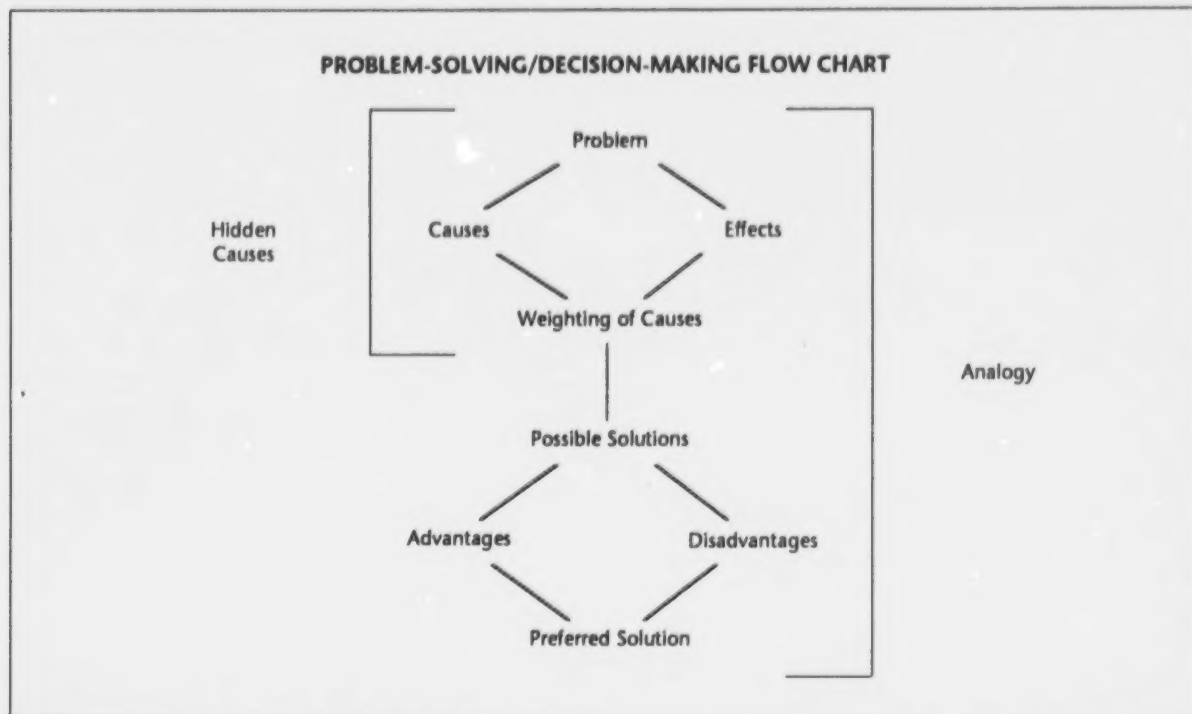


Figure 12 Problem-solving/Decision-making Flow Chart

metacognitive cues, such as those on the thinktrix, the bookmarks, and the reading wheel.

Through their regular use of graphic organizers, students come to recognize that thought can be shaped, teachers discover a set of powerful tools for rendering the invisible process of thinking visible, and both students and teachers experience the benefits of shared metacognition.

The Problem-solving/Decision-making Flow Chart

A middle school teacher sits at home considering a frequent problem in the classroom: many students do not follow directions. As he thinks along a path suggested by a problem-solving flow chart, he discovers the hidden cause and decides on a solution.

A proven cognitive tool for enhancing student and teacher problem solving and decision making has been rendered as a flow chart. The problem-solving/decision-making flow chart (Figure 12) includes a behaviorally stated problem, analyzing cause and effect, weighting causes, seeking hidden

causes, deriving solutions related to the key causes, evaluating solutions according to predicted effects, selecting a solution, deriving a principle underlying the solution, and testing the solution formally or informally. In addition to this logical sequence, the user may also apply analogical thinking at any point in the problem-solving process.

This flow chart (Eley & Lyman, 1987) has evolved from work with beginning teachers to help them with the often overwhelming tangle of classroom problems and decisions. In its present form it has been proven sufficiently useful and flexible to relieve the teacher of considerable anxiety.

Both teachers and students seem to recognize the strength of this particular problem-solving, decision-making process more when they first try to solve problems without it. In this fashion, they realize how close the heuristic is to the way most people work at problem solving. They also realize that not having a guide to the process makes it more likely that they will skip crucial steps and thereby make an ill-considered decision.

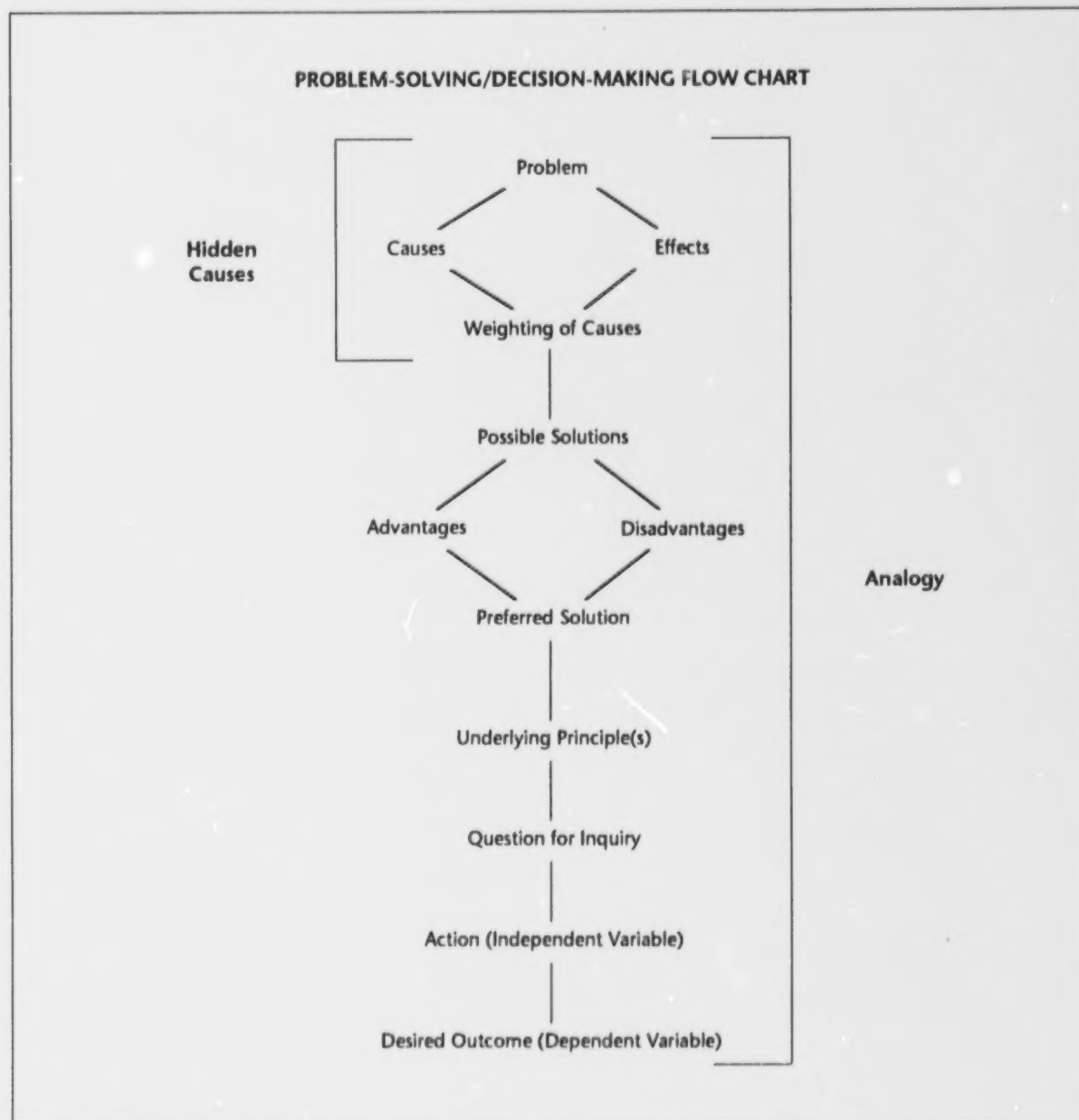


Figure 13 Problem-solving/Decision-making Flow Chart

Teachers also discover that this process, once cued and practiced, makes an indelible imprint on their minds and is even helpful in solving problems outside of the classroom. In addition, children find the flow chart understandable and useful.

The flow chart serves as an ideal format for classroom-based action research (de Pinto, 1988). Once

the problem has been identified, the solution emerges as the independent variable for a formal study of effects (Figure 13). As teachers recognize the similarities between the type of thinking called for in problem solving and the research process, they will see educational research as more relevant and connected to their day-to-day work.

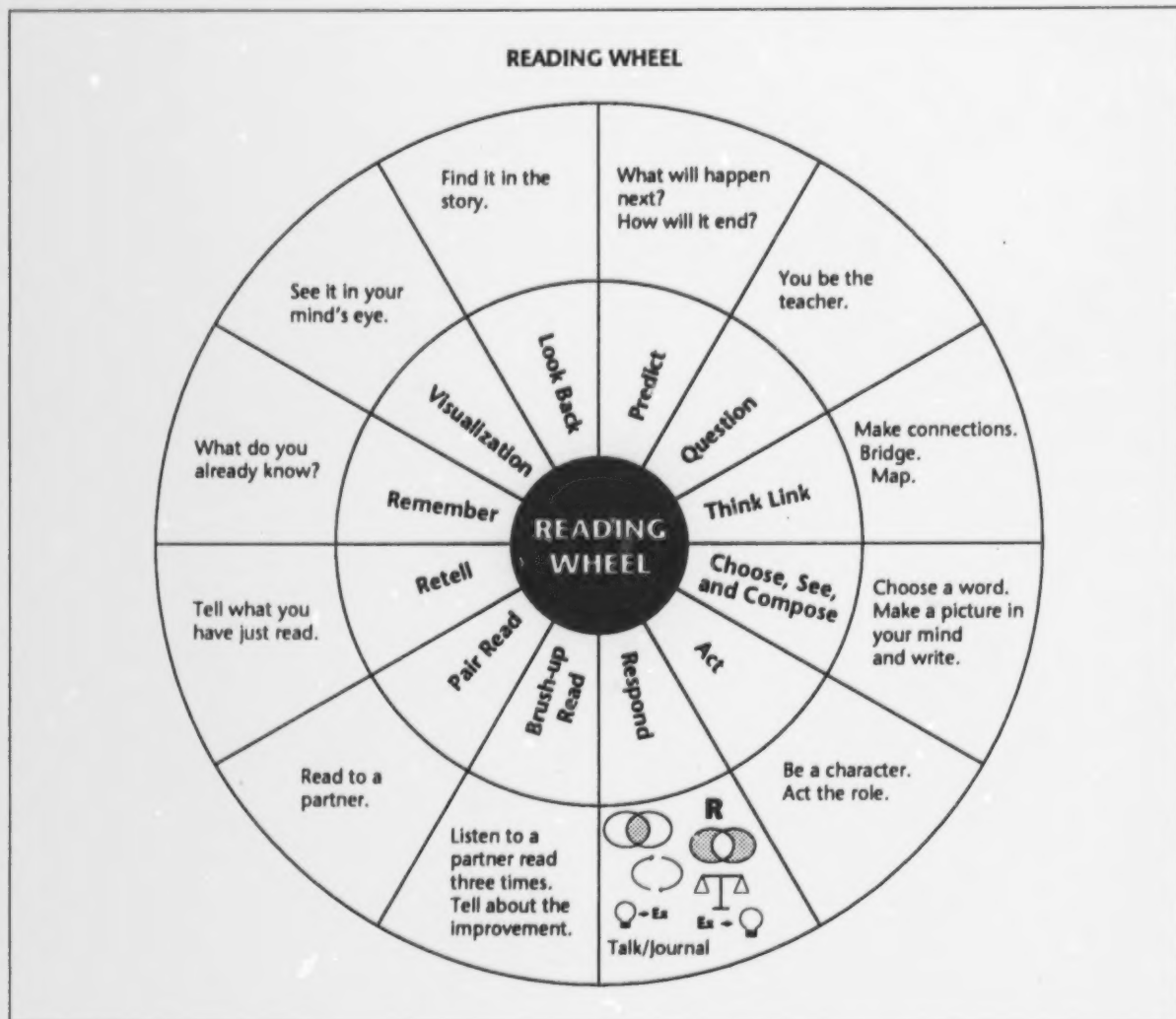


Figure 14 Reading Wheel

The Reading Wheel

As the fourth graders conclude silent reading, they look at the reading wheel poster mounted on the classroom wall to remember their next task. The wheel indicators are set on question, predict, and think link.

In reading and literature groups teachers tend to neglect all but a few learning or comprehension strategies, relying instead on what Delores Durkin (1978 - 79) calls interrogation. Even though it is current to include prediction, and in enlightened situations the reciprocal teaching sequence, most

elementary teachers do not employ other proven strategies. To the extent that forgetting within the complexity of classroom events is a major cause of this omission, a solution is the reading wheel (Figure 14), a tool containing numerous reading response strategies.

With such a tool teachers can teach children how to comprehend text and derive meaning. The students learn how to learn as they regularly apply proven comprehension strategies. The wheel, or another shape, reminds teacher and students of research-tested mental activities. Used with indicator arrows, the wheel can be set to remind all



Figure 15 The "B" Wheel

participants where they are and what is expected at any given moment. The strategies can be named cleverly to appeal to the particular age and development levels of the students. The reading wheel is similar to the ready reading reference bookmark, though it is more inclusive and is used as a wall cue.

The "B" Wheel

The eleventh grade physics teacher is frustrated by the apathy of her students. In search of an idea to improve classroom attitudes toward her subject, she looks at a wall chart—the B wheel—chooses bridge,

and asks the students to think about how the newly introduced concept will be useful in their lives.

As a stimulus to unfortuitous amnesia the classroom can't be beat. In a swirl of events, teacher and students have difficulty recalling content, processes, and concepts. The result is stilted dialogue and halting action unrepresentative of what the participants know or can do. This inability to remember is particularly damaging when the teacher has to make on-the-spot pedagogical decisions. Given this phenomenon of the classroom, a visible cue serves as a valuable aid by reminding the

teacher of key concepts and principles of teaching and learning.

It is possible to display such cues as individual principles as well as in an integrated format. The "B Wheel" (Figure 15) offers such an integrated design. Constructed from numerous theory-making sessions with teachers and student teachers, this theory-practice template serves as a reminder of critical attributes of effective teaching/learning interactions. The teacher can use the laminated tool in desk size or as a display poster to be seen across the room.

The proposition underlying the use of tools such as the B Wheel is that teachers will use the accessible theory to make better decisions than they would if they had no reminder. When the concepts are coined and patterned as on the B Wheel, there is also the likelihood that the teacher will eventually think of the elements without looking at the cue.

THE BENEFITS OF THEORY-EMBEDDED TOOLS

The aforementioned cognitive tools serve as catalysts for creating an active, responsive, "thinking" classroom. Teachers and students who reside in such classrooms have pointed to at least five benefits realized from the use of these tools.

An Aid to Memory

Thinking tools serve as tangible cues for teachers and students. They provide immediate access to theoretical knowledge when it is needed most—at the point of decision making. In the complex and distracting dynamics of school, the concreteness and stability of these tools remind teachers and students to use what they know to enhance their thinking and learning. The permanence of the tools frequently leads to "mental templating." This is evidenced by reports from teachers and students who remember the message embedded in the tool even when the tool itself is not present. As a result, memories of ways to think and act persist beyond the classroom.

Common Frame of Reference

Thinking tools provide a mutually understood frame of reference for teachers and students by of-

fering common terminology, such as the thinking types on the thinktrix, and specific cues for action, such as the signals associated with think-pair-share. The tools provide congruence that facilitates carryover from one classroom and subject area to others, resulting in a consistent approach within the school. This common frame of reference also contributes to the ability of students and teachers to reflect on their own thinking and learning, or shared metacognition.

Bridging In/Bridging Out

Current understanding of the learning process points to the importance of mobilizing relevant prior knowledge associated with new concepts to be learned. By taking time to "bridge in" and "bridge out," teachers help students activate a conceptual pegboard in their minds on which they can hang or integrate new concepts. Theory-embedded tools such as graphic organizers serve as tangible representations of this prior knowledge and as a medium for connecting it to new knowledge. Cued learning strategies such as visualizing aid students in assimilating new information.

Cognitive tools also facilitate transfer by "bridging out" from the initial learning context. For example, the use of a graphic organizer, such as the character map, not only serves as an aid for analyzing literary characters. It may also be applied to historical figures studied in a social studies class. The social studies teacher who mounts a character map poster on the wall facilitates cross-disciplinary application through the use of this cognitive tool.

Theory Making and Theory Use in the Classroom

Ready-made devices such as those described in this chapter offer one set of examples of theory-embedded tools. Another application emerges from the constructivist view of learning (Brooks, 1990). As illustrated in the first two classroom scenarios at the beginning of this chapter, students can be involved in actually creating their own theories and inventing associated tools. Such an approach to instruction turns the educational process away from the passivity of the lecture/recitation model; it actively involves students in constructing knowledge.

CREATING THE THOUGHTFUL CLASSROOM

By serving as an epistemic reminder that all knowledge was created, rather than being passed down intact, this constructivist approach encourages children's ownership of their own learning.

The same process of theory building offers equal benefits when applied within teacher education courses or staff development programs. As teachers become actively involved in constructing theories regarding significant variables such as motivation, instruction, and classroom management, more mindful and reflective teaching occurs. In addition, such professional theory making leads to the development and refinement of even more effective classroom tools. The B Wheel is a product of such theorizing.

Theory making spawns theory using. Once a theory template is developed and made available in the classroom—in such forms as a wall chart, game board, and bookmark—the teachers and students have a common frame of reference to serve as a reminder and guide for the lesson's depicted strategies, rationale, contexts, or dispositions.

Teacher Education/Staff Development

Innovations are difficult to maintain in schools. These thinking tools, visible and concrete, may help hold an innovation in place. Although teachers are bombarded by advice and mandates, many of which appear to complicate their work, they welcome new ideas and materials that have a proven value. The theory-embedded tools described here have been enthusiastically received because they have practical value and are ready for immediate use. These tools enable teacher educators to send both novice and experienced teachers into the field with practical embodiments of theory. Staff developers who encourage the invention and use of instructional tools will see the elusive theory-into-practice connection made and maintained. Furthermore, as Gage (1974) suggests, research on tools will test theory in practice and expand the knowledge base for teaching.

An interesting phenomenon has been observed as a result of the expanded use of theory-embedded tools. Teachers who observe such tools as book-marks, wheels, and posters in the classrooms of their colleagues inevitably inquire as to their use. This inquiry leads to a discussion of their benefits, frequently culminating in a request for the tool. Thus, the tool serves as a stimulus for collegial interactions, and a catalyst for a "natural curiosity" approach to peer-to-peer staff development.

THE PROMISE OF THEORY-EMBEDDED TOOLS: IMPLICATIONS FOR THE CLASSROOM

Instructional tools present a valid, concrete, relevant, and practical system for involving students from nursery school through graduate school in the active processing of ideas. These tools are an essential part of the vision of the active, minds-on, cooperative, responsive, and constructivist classroom. Their use ensures the embedding of theory in practice. The restraining forces which over time have prevented state-of-the-art teaching and learning can be partially overcome through these tools. It is important to realize, however, that the formula for creating a community of learners includes more than the use of tools. Cooperative learning (the sharing of thought), wait time (the time for thought), metacognition (the awareness of thought), cognitive incongruity or problematics (the fuel for thought), theory making (the ownership of thought), and cognitive mapping (the shaping of thought) are all essential, overlapping, and interactive with the tools and each other. The classroom is an econiche of crucial variables dependent upon each other and enhanced by theory-embedded tools. Theory-embedded cueing devices promise to bring classroom teaching into closer harmony with known principles of effective instruction, thereby improving the quality of thinking and learning for all students.

REFERENCES

- Armbruster, B. B., & Anderson, T. H. (1980). *The effect of mapping on the free recall of expository text*. (Tech. Rep. 160). Urbana-Champaign: University of Illinois, Center for the Study of Reading.
- Brooks, J. (1990). Teachers and students: Constructivists forging new connections. *Educational Leadership*, 47(5), 68-71.
- Dansereau, D. H. (1986). Cooperative learning strategies. In C. Weinstein, et al. (Eds.), *Learning and study strategies: Issues in assessment, instruction, and evaluation* (pp. 103-120). New York: Academic Press.
- Davey, B., & McBride, S. (1986). Effects of question-generation training on reading comprehension. *Journal of Educational Psychology*, 78(4), 256-262.
- Davidson, J. L. (1982, October). The group mapping activity for instruction in reading and thinking. *Journal of Reading*, 27(7), 53-56.
- de Pinto, T. (1988). Action research: A teacher's perspective. *Reading Issues and Practices*, 5(3), 52-56.
- Durkin, D. (1978-79). What classroom observations reveal about comprehension instruction. *Reading Research Quarterly*, 14, 481-533.
- Eley, G., & Lyman, F. (1987, Spring). Problem solving and action research for beginning teachers. *Maryland A.T.E. Journal*, 2(2), 16-19.
- Gage, N. L. (1974). *Teacher effectiveness and teacher education: The search for a scientific basis*. Palo Alto, CA: Pacific Books.
- Gall, M. (1970). The use of questions in teaching. *Review of Educational Research*, 40, 707-721.
- Garner, R. (1980, Spring). Monitoring of understanding: An investigation of good and poor readers. *Journal of Reading Behavior*, 12, 55-64.
- Garner, R., & Reis, R. (1981). Monitoring and resolving comprehension obstacles: An investigation of spontaneous text lookbacks among upper-grade good and poor comprehenders. *Reading Research Quarterly*, XVII(4), 569-582.
- Gemake, J., & Sinatra, R. (1986, November-December). Using maps to improve writing. *Early Years*, 17, 52-65.
- Goodlad, J. (1985). *A place called school*. New York: McGraw-Hill.
- Hare, V., & Pulliam, C. (1980, Spring). Teacher questioning: A verification and an extension. *Journal of Reading Behavior*, 12, 69-72.
- Johnson, D., & Johnson, R. (1984). Cooperative small-group learning. *Curriculum Report*, 14(1), 1-6.
- Jones, B. F., Amiran, M., & Katims, M. (1985). Teaching cognitive strategies and text structures within language arts programs. In J. Segal, S. Chipman, & R. Glaser (Eds.), *Thinking and learning skills (Vol. 1): Relating instruction to research*, (pp. 259-290). Hillsdale, NJ: Lawrence Erlbaum.
- Kapinus, B. (1986). *Ready reading readiness*, (bookmark). Baltimore: Maryland State Department of Education.
- Lyman, F. T., Jr. (1989). Choreographing: The middle-level minuet. *The Early Adolescent Magazine*, 4(1), 22-24.
- Lyman, F. T., Jr. (1987). The think-trix: A classroom tool for thinking in response to reading. In L. Gambrell (Ed.), *Reading: Issues and practices, yearbook of the State of Maryland International Reading Association Council* (pp. 15-18). College Park: Univ. of Maryland.
- Lyman, F. T., Jr. (1985). The reading wheel: Response cues for comprehension. In L. Gambrell (Ed.), *New directions in reading: Research and practice, 1985 yearbook of MD International Reading Association* (pp. 30-35). College Park: Univ. of Maryland.
- Lyman, F. T., Jr. (1981, Spring). The development of tools. *Maryland A.T.E. Journal*, 1(1), 20-21.
- Lyman, F. T., Jr. (1981). The responsive classroom discussion: The inclusion of all students. *Mainstreaming Digest*, 1(1), 109-114.
- Lyman, F. T., Jr., Lopez, C., & Mindus, A. (1986). Thinklinks: The shaping of thought in response to reading. Unpublished manuscript.
- Mayer, R. (1983). *Implications of cognitive psychology for instruction in mathematic problem solving*. San Diego: San Diego State University.
- McTighe, J. (1985). *Questioning for quality thinking: Strategies for extending student thinking*, (bookmark). Baltimore: Maryland State Department of Education.

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- McTighe, J., & Lyman, F. (1988, April). Cueing thinking in the classroom: The promise of theory-embedded tools. *Educational Leadership*, 45(7), 18-24.
- Paris, S., & Jacobs, J. (1984). The benefits of informed instruction for children's reading awareness and comprehension skills. *Child Development*, 55, 2083-2084.
- Rowe, M. B. (1986). Wait time: Slowing down may be a way of speeding up! *The Journal of Teacher Education*, 31(1), 43-50.
- Schoenfeld, A. (1980). Heuristics in the classroom. In S. Krulik & R. Reys (Eds.), *Problem solving in school mathematics* (pp. 9-22). Reston, VA: National Council of Teachers of Mathematics.
- Schoenfeld, A. (1979). Can heuristics be taught? In J. Lochhead & J. Clement (Eds.), *Cognitive process instruction* (pp. 315-338). Philadelphia: Franklin Institute Press.
- Slavin, R. E. (1981). Synthesis of research on cooperative learning. *Educational Leadership*, 38(8), 655-660.
- Suydam, M. (1980). Untangling clues from research on problem solving. In S. Krulik & R. Reys (Eds.), *Problem solving in school mathematics* (pp. 34-50). Reston, VA: National Council of Teachers of Mathematics.
- Vaughn, L., Jr. (1982, February). Use the construct procedure to foster active reading and learning. *Journal of Reading*, 25(5), 412-422.

MEANING IS THE METHOD: WHOLE LANGUAGE IN THE THOUGHTFUL CLASSROOM

Laura Lipton

It is the teacher who can open the book, unfold the story, and invite the reader. It is the teacher who can create the safe harbor where students can share their lives and their literacy. And it is the teacher, above all, who can join hands with the learners.—Dorothy J. Watson

Whole language is about the joy of teachers and students holding hands and engaging together in making meaning of the world. It defies definition because it is an expression of the way in which teachers create learning opportunities for their students and themselves. As Lois Bird said, "Whole language is a way of thinking, a way of living and learning with children in classrooms" (1987).

The curriculum in the whole language classroom is organic. It exists as a natural outgrowth of the interaction among the teacher, the students, and the environment. It is supported and nurtured by the ongoing discoveries of learners as they explore the world around them and strive to make sense of it. Whole language instruction is built on learners' questions, reflections, trials, and errors as they engage in purposeful, relevant activities of

their own choice. In fact, language users learn as much from their errors as they do from their successes, and often more. Whole language teachers strive to create an environment in which students have lots of opportunities for language use, where they can grow as a result of experimentation, and where error reduction—not error elimination—is the aim of instruction.

The whole language teacher is a co-learner in a classroom community of learners. Every day, the teacher provides models of printed conventions by reading to and with the class and by writing for and with the students. Every day, too, the teacher responds to students in ways which encourage risk taking and demonstrate the expectation that everyone is an able learner.

Whole language instruction is a developmental, holistic, meaning-making approach to literacy and learning. Students learn through purposeful, contextual experiences rather than through instruction of isolated skills. This chapter presents classroom climates, teacher behaviors, instructional activities, and curriculum from the whole language perspective. The following sections explore the teaching/learning relationship. They focus on providing positive learning experiences in developing

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literacy, viewing reading as a problem-solving strategy, and helping students cultivate the joy of reading as a lifelong pursuit.

DEVELOPING MEANING: DEVELOPMENTALLY APPROPRIATE INSTRUCTION

Thoughts are our way of connecting things up for ourselves. If somebody tells us about the connections he has made, we can only understand him to the extent that we do the work of making those connections ourselves.—Eleanor Duckworth

Spoken language develops as a result of function and social interaction. The need to communicate creates a purpose for language. Consider the first words uttered by most toddlers, "Ma-ma, Da-da, ba-ba, bye-bye." These words convey the clearest meaning in the most efficient way. We use language to make sense of the world, to have our needs met, and to maintain some control of our environment. Toddlers gauge the responses to their initial efforts and begin to refine and expand their ability to communicate in a meaningful way. When the baby says "ba-ba" and is given a bottle, the communication has been successful. Over time, children experiment with more sophisticated constructs, exploring new sounds and word combinations and stringing several words together to make sentences. Always, though, meaning is the primary goal.

Literacy develops just as naturally as language does. It would never occur to parents of a normal toddler that their child will not learn to speak. Nor would it be likely that the parents would respond to these initial attempts at language by saying, "No, not ba-ba, *bottle*. Now try again." And yet, in many traditional classrooms, teachers respond to children's initial attempts at literacy in just such a way. On the path to learning, children approximate language conventions. They combine a smattering of letters with other symbols and squiggles to convey meaning in print. They "read aloud" a story they've heard repeatedly using picture cues and their memory. By attempting to eliminate errors, rather than celebrate them as a child's experimental ef-

forts at learning, teachers can easily squelch a student's motivation to continue to engage in language learning without the certainty of being correct.

Children come to school with a tremendous amount of knowledge about the conventions of language. They are aware of the variety of the print they find in the environment, such as stop signs and store names, as well as elements of stories and books (Pearson & Dole, 1987). They can make distinctions between different types and purposes of writing—for example, a letter as opposed to a story. Most children entering kindergarten understand about 5,000 words, speak in complex sentences, and are curious about the appearance of their language in writing (Norton, 1983). Whole language instruction begins with what each student already knows. In the whole language classroom, children are provided additional models of speech and print. They are read to every day from a literature base that includes poems, songs, plays, non-fiction, a variety of genre of fiction, and any other appropriate and authentic material. The story sounds, content, and form expand students' knowledge base about literature, add to the shared experience base of the class, and serve as the departure point from which students can launch their adventures in reading and writing.

Opportunities abound for students to engage in purposeful activities that help them exercise their developing skills and work out the kinks—for it is by reading that one learns to read, and by writing that one learns to write. In these learning endeavors, experimentation and error reduction are the norm. And just as the natural response to the request for *ba-ba* would be to provide the bottle and say, "Here is your *bottle*," the natural response to initial attempts at spelling, grammar, or form might be a compliment of the effort and a response in print that models the convention, gently shapes growth, and fosters self-esteem.

As children are given a voice in selecting their learning options, they begin to develop a greater level of responsibility for their work and a greater level of commitment to their learning. Within given parameters, students should be able to choose some of the things they want to learn about

and when they will learn them. These "curricular invitations" are carefully planned by whole language teachers (Watson, 1989, p. 136). These teachers use their knowledge of student needs and interests and appreciate the importance of cultivating students' ownership in their reading and writing. Choices can include which ten spelling words a student wants to learn this week, which book to read, or at which centers to work.

Whole language instruction relies on relevant materials that are authentic—not materials contrived to provide drill for isolated skills. Such authentic reading and writing materials are plentiful and accessible. The whole language classroom is filled with trade books, newspapers, magazines, resource materials, restaurant menus, flyers, posters, student-produced books, written directions, message boards, and so on. In the early grades, books such as Eric Carle's *The Very Hungry Caterpillar*, Bill Martin Jr.'s *Brown Bear, Brown Bear*, and Margaret Wise Brown's *Good Night Moon* provide repetitious or patterned language to help give emergent readers confidence and experience in anticipating text.

Examples of student-generated language are also apparent. Experience charts and stories provide teachers with an opportunity to demonstrate writing conventions, and they give students relevant text to read. In one second grade classroom in Rochester, New York, one wall is devoted to a "living" bulletin board. The students create large scenes based on the topic or theme being studied. They put words and labels, signs, and speech in bubbles connected to the various characters in the scene. As the unit progresses, new information is added, words are changed, and concepts are more clearly expressed through the written dialogue between the bulletin board figures. In a fourth grade classroom in Decatur, Indiana, students create word mobiles, four sided figures suspended from the classroom ceiling. Each week, students fill in one side of their mobiles with words that are meaningful or interesting to them, or relevant to a topic being studied. Weekly, on mobile-hanging day, students ceremoniously read aloud their word list to the class before adding it to the mobile. The classroom is filled with print in an ever-changing display. Each month, students take home their mobiles and begin new ones.

Writing is a celebrated activity. Most whole language classrooms have writing centers, publishing possibilities, and special opportunities for student authors to share their work. Students need experience writing for 'real' reasons and for 'real' audiences. As part of the daily routine, students are encouraged to generate lists, write notes, send messages, compose riddles, produce plays, and keep journals. A first grade classroom in White Plains, New York, has a wonderful yard-sale relic, a plushy taffeta-covered armchair. It has become the "author's throne." Each week, a student author who has recently "published" a piece of work in class has a chance to sit on the throne and read the work aloud to the class. The work is then shared with others in the school. Often the published piece is returned to the author with special messages from those who have enjoyed the chance to read it. In another school district in Westchester, New York, library cards are pasted in the back of each student's published book, and the book is placed in the school library. At the end of the year, the authors can see how many people have checked out their work.

Language is central to learning. Halliday (1984) suggests three types of language learning—learning language, learning through language, learning about language—all of which develop through using language in meaningful contexts. Fundamental to whole language instruction is the principle that meaning is always the goal of language use. Learners construct meaning while reading and listening, and they express meaning while speaking and writing. In a whole language classroom, instruction builds on students' experiences by providing authentic, functional activities through which students engage in language learning. Children learn language conventions by employing them purposefully.

MAKING MEANING: PURPOSEFUL INSTRUCTION

Can we really believe that a child is going to develop a sense of self doing reading skills for forty minutes a day, five days a week, thirty weeks a year? Does an

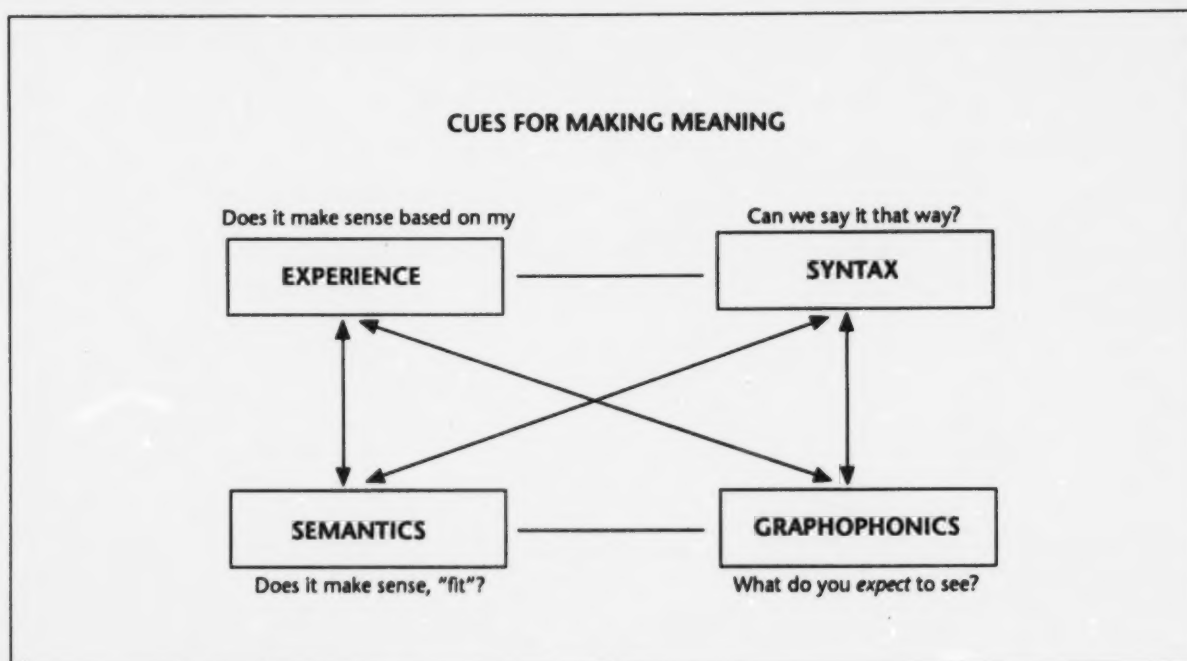


Figure 1 Cues for Making Meaning

uninterrupted diet of skill and drill make a child want to escape into the world of books or away from it? —Jim Trelease

Reading comprehension is what readers do to make sense of printed information (Harste, 1989). Ken Goodman calls reading a "psycholinguistic guessing game" (1967). It is a constant stream of predicting, confirming, and integrating information. Text offers three primary sources of information, or cueing systems: semantic, syntactic, and graphophonic. Here is an illustration. Choose a word to fill the blank in the following sentence: The little girl rode her _____. You might have chosen *horse*, *pony*, or *bicycle*. You used semantic cues to choose a word that makes sense. Chances are that you also chose a noun. Your knowledge of English syntax supported that choice. If a phonetic clue, such as an initial consonant, were available, there would be another method for confirming or refining your hunch. For example: The little girl rode her m _____. Now, you might have chosen *motorcycle*, or *mare*.

These cueing systems provide students important sources of information for making meaning from text. Fluent readers rely on these cueing systems—combined with their own experience—to make and confirm their best guesses during reading. (See Figure 1.) They use their semantic sense, drawn from their own life experience and picture clues; their syntactic sense, drawn from knowledge of spoken language and of book language; and their graphophonic sense, based on their knowledge of spelling patterns and word structure. Skilled readers use these cues interactively when reading. They use these cueing systems to cross-reference their predictions and the meaning they are making from the text. This cross-checking can raise discrepancies and facilitate self-correction. Thus, it is important that students can flexibly use all three sources of information and not overly rely on any one.

As we read, we use the language cueing systems and our own experience to anticipate what is coming next and to make inferences. Read the following passage:

Vanessa heard the gravel crunch on the driveway. She quickly said good-bye and slammed down the receiver. She scanned her room for the most obvious mess, grabbed for the clothing scattered on the floor and began stuffing it under the bed. Five o'clock already!

What was Vanessa doing? What was she supposed to have been doing? What guesses might you make about Vanessa and about her home? Although the reader is not told explicitly, it can be inferred that Vanessa was on the phone (slammed down the receiver), that she was supposed to clean her room (scans and stuffs), and that someone has arrived to whom she is probably accountable (crunch on the driveway, five o'clock already!). Further, you might infer that she is a teenager (home alone, on the phone, room a mess), and that she comes from a suburban home (phone in her room, gravel drive).

In the whole language classroom, learners are provided opportunities to develop strategies that build on their experience and support their ability to use their experience to make meaning. In addition, instruction is organized to enable learners to connect new information to prior experience. Thus, learners are better able to integrate new knowledge into existing schema and to 'own' that which is now known.

INTEGRATING MEANING: STRATEGIC INSTRUCTION

The more meaningful, the more deeply or elaborately processed, the more situated in context, and the more rooted in cultural, background, metacognitive, and personal knowledge an event is, the more readily it is understood, learned, and remembered.

—Iran-Nejad, McKeachie, & Berliner

Meaningful learning is an active, constructive, and cumulative process (Shuell, 1990). "Fluency is not a state which is finally attained; one is continually arriving" (Newman, 1985, p. 31). Learning to read and write develops from the continual process of interaction with print and language.

Reading is the interaction between the reader and the text. The experience of the learner is a critical component in this interaction. There is a

clear correlation between success in reading and the reader's level of background knowledge. Therefore, ensuring that students bring some background knowledge to a reading task can be crucial to the students' success. While all students have some experience and prior knowledge to bring to a learning situation, some do not have the ability to link it to new information or even to retrieve it. For these students, their prior knowledge remains "inert" (Bransford, et al., 1986). These students must be taught strategies that will help them access what they already know, as well as strategies for organizing new information into patterns that will help them make connections and integrate new understandings. Brainstorming is an excellent method for generating and enriching students' knowledge base before reading. The term *brainstorming* was coined by advertising executive Alex Osborn in the late 1940s. The acronym **DOVE** helps students remember the brainstorming rules:

Defer judgment (no praise or criticism)

Opt for originality

Variety and volume are desired

Expand by piggybacking

(Bellanca & Fogarty, 1991, p. 57)

The idea-generation process surfaces students' inert knowledge for their active use. Also, setting time limits for the process helps keep groups focused. One extension of brainstorming is to group the ideas into categories after they have been generated. Then, create titles for each group. Charts listing each category can be posted and additional ideas can be recorded as the unit progresses. The charts give the class a picture of their current working knowledge and demonstrate that learning is a process.

Another structured strategy for brainstorming is the *what I know, think I know, want to know* chart adapted from a strategy developed by Donna Ogle at the National College of Education in Evanston, Illinois. For this strategy, students work in small groups with a recorder in each group. The groups brainstorm all of the things they either know, think they know, or want to know about the topic they will be studying. They record their ideas on a three-

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column chart. As students offer ideas, they tell the recorder in which column to place them. The "Think I Know" column serves as a pressure release valve. Those students who are unsure but would like to contribute can direct their ideas to this column. The questions in the "Want to Know" column create a purpose for reading about the new topic. As with all brainstorming, the goal is to generate as many ideas as possible. It is not a time for debate or discussion about the ideas. These charts can be saved or posted for students to reference as they study the material. Posting the charts also serves to immerse students in their own language.

Other ways of building background knowledge include providing input through a film, a field trip, a discussion, a simulation, an experiment, or a demonstration. Sometimes a simple reading passage can provide a foundation for students to understand a more complex piece of reading. Clearly, however, we know that background knowledge is necessary for understanding. When teachers take the time to elicit from students what they already know; surface and clarify any misconceptions; provide concrete and foundational experiences prior to new learning; and discuss previously learned concepts and make predictions as to where they might lead, they are greatly increasing the likelihood of students gaining successful new learning experiences.

Characteristics of effective readers have been identified in varied literature. Successful learners are strategic (Paris, Lipson, & Wixson, 1983). They have a repertoire of cognitive and metacognitive strategies, which they can employ before, during, and after reading to construct meaning and retain information. They actively adopt a problem-solving approach to learning (Bereiter, 1989). Through self-regulation during reading, they monitor their understanding and recognize when meaning has been lost (Garner, 1990). They use their "conditional knowledge" to know when to invoke the appropriate strategies for solving the meaning-making problem (Paris, Lipson, & Wixson, 1983). Further, successful learners know when to disband use of an unsuccessful strategy and choose another.

Judith Newman (1985) described three basic types of reading strategies: predicting, confirming,

and integrating. When readers use predicting strategies, they generate expectations of what will come next based on information from one or a combination of the cueing systems available. Confirming strategies are comprised of self-questioning or self-monitoring to see whether the prediction was correct, and whether what is being read makes sense. Integrating strategies incorporate new information and newly constructed meaning with prior knowledge. We integrate new definitions, unfamiliar concepts, and complex ideas and relationships. These three strategies rely on making meaning from the text as a whole and monitoring our meaning making. Students need to internalize the questions that support metacognition: "How am I doing?" "Does this make sense?" "What should/might I do differently?" "What resources do I have/need?" Fluent readers continually confirm predictions and generate new ones. They confirm or refine tentative understandings based on additional information and integrate new information as a basis for further prediction. These strategies work continuously and in concert as readers engage with text.

Consider your own strategies for making meaning. Take a moment to think about what you do when you lose meaning while reading, or when you encounter something unfamiliar in the text. Most fluent readers choose from a number of alternatives: they can continue reading to see if information is offered later in the passage; they can generate a substitute that makes sense to temporarily hold the place of an unknown term or concept and go on; they can refer back to what they already read to see if they missed something that would give some clues; or they can do nothing to see whether not knowing a particular term will matter in terms of understanding the whole passage. If we ask our students that same question, "What do you do when you come to something you don't understand?" the fluent readers will describe one or more of the above. Our less able readers will usually say that they "sound it out," "look it up," or "ask someone."

In the whole language classroom, finding and conveying meaning is the only reason for reading, writing, listening, and speaking. This message can-

not just be told; it must be modeled constantly and conveyed instructionally. Students need practice in dealing effectively with unfamiliar words or ideas while reading. Whole language classrooms provide these opportunities in a variety of ways. By moving from skills lessons to strategy lessons, we help students become fluent readers while understanding that the meaning of the whole is not necessarily dependent on being able to identify and understand every word. The following examples illustrate strategy lessons that help students develop predicting, confirming, and integrating strategies. These activities also encourage dialogue among students.

The *word splash*, developed by Dorsey Hammond of Oakland University in Rochester, Michigan, is a motivating and interesting method for generating predictions. Students are given a page with a group of eight to ten words "splashed" across it. The words are taken from a reading selection. Students work in groups to predict what the reading will be about. They can be directed to generate best guesses or even outline their hunches about the storyline. The selection could be a piece of literature, an article on a current event, or content-based text material. Directed reading and thinking activities such as this one are appropriate with any coherent text.

Synonym substitution, developed by Yetta Goodman and Carolyn Burke, teaches students to use the place-holding strategy to maintain meaning and not interrupt the flow of their reading. Students work in small groups. First, students silently read a passage, underlining any unfamiliar words. Then, each group reads the same passage together, trying to supply a minimum of two substitutions for each underlined word. The substitutions, which can be words or short phrases, are recorded and later discussed. A good method for introducing this activity is to use familiar stories or fairy tales, which are less threatening to less proficient readers.

Reader-selected miscues, developed by Dorothy Watson at the University of Missouri, demonstrates that one does not have to understand every word to make meaning from text and that what is familiar can be used to understand what is not. For this activity, students silently read a selection, highlighting anything that is not clear or that they have

questions about. Then, with their small group, they take turns discussing what they have marked. They are asked to consider which items affected their understanding of the selection and which did not. During the discussion, students are encouraged to refer to the text for clarification. Either factual or fictitious passages can be used.

For *say something*, developed by Jerome Harste of the University of Indiana, students choose partners. Before reading their copy of a selection, partners decide how they will read—silently or orally, and in unison or alternately—and how much they will read before stopping to 'say something.' Students read until they reach their predetermined points to stop. Then they ask questions, react to information, seek clarification, discuss other information that is confirming or contradictory, or say something else. After each pair has completed reading and discussing the selection, they share their reactions with other student pairs. This activity promotes the connection of new information to that which was previously known. The sharing enables students to see how others make meaning, expands the students' shared experience base, and facilitates integration.

Reading is an interpretive process that incorporates much more than the visual material on a printed page. Efficient readers supply important nonvisual information to make meaning from print. Therefore, interpretations are individual and distinct. The whole language teacher provides frequent and varied opportunities for students to construct their own meaning while engaging with many types of printed material. The opportunity for verbal interaction with other students allows for a richer understanding of the process. The focus of these interactions should help students articulate their own interpretations, consider those of others, and relate all of this back to the text.

Students need not be their own curriculum coordinators (Lincoln, 1990). Whole language shifts curriculum control from "teachers' manuals to teachers" (Goodman, 1989, p. 215). The whole language curriculum integrates the language arts as well as the content areas. Content information provides a substantial forum for exercising literacy.

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The challenge is to develop strategies to help individuals in the process of creating a unity of knowledge (Taba, 1962). Meaning must be made from the information of content areas. In their subject areas, students engage in such strategies as questioning, predicting, organizing, interpreting, and summarizing.

Students need explicit instruction in context-based planning and monitoring (Garner, 1990; Ceci & Liker, 1986). In addition, for successful transfer across contexts, students need extensive practice in a variety of settings (Brown, Campione, & Day, 1981). Whole language instruction, by offering relevant, authentic experiences that integrate curricular areas, provides such experience. When students research environmental issues, for example, and work on problem-framing/solution-finding projects, they are integrating science and social studies. When they conduct surveys, collect and graph data, write letters for information or in support of certain legislation, or suggest creative solutions for environmental problems, they are integrating the language arts as well.

ENHANCING MEANING: JOYFUL INSTRUCTION

Amidst all the workbook pages and academic jargon, we daily overlook the very purpose of literature: to provide meaning in our lives.—Jim Trelease

The ability to find meaning in our lives is both the greatest need and perhaps the most difficult achievement that we face as human beings. It is the function of literature, particularly fiction, to present life's meaning, to arouse our emotions, and to show us how to understand conflict. Literature provides an escape from our everyday existence into the lives of others. It allows us to vent life's pressures through laughter, tears, hate, and love. We look to books to give us insight into our own life story (Trelease, 1982).

In his widely recognized work, *The Uses of Enchantment*, Bruno Bettelheim (1976) credits three factors as being primarily responsible for instilling in children the beliefs that their lives are mean-

ingful, and that they are capable of making a significant contribution. These factors are parents, teachers, and literature.

What greater gift can a teacher give than that of a lifelong love for literature? Reading informs us, entertains us, and connects us to the world by reminding us that we are not alone (Boorstin, 1987). Yet, the unspoken message communicated in many classrooms is not that reading is purposeful and pleasant, or that it can bind us to a deeper universal experience, but that reading is boring work. It is associated with dull dittos, redundant worksheets, endless homework assignments, and end-of-unit tests. For many poor readers, "meaningless texts, contrived tasks, and competitive contexts can combine to distort [their] perceptions about reading, destroy their self-confidence and curiosity, and confound their efforts at becoming literate" (Winograd, 1989, p.240).

In the whole language classroom, several factors help students discover the delights of reading: reading aloud; uninterrupted, sustained, silent reading (USSR); many choices in learning activities; and a classroom culture that provides a risk-free environment in which reading is the norm.

Reading aloud to children is an important way to arouse their desire to read to themselves. Reading aloud can stir the imagination and introduce students to the different sounds of language and the different forms of literature. Reading aloud expands vocabulary. It can stretch and challenge thinking because, especially in the early grades, most children's listening comprehension far exceeds their reading comprehension. It can help children develop a taste for quality literature and an understanding of the ways in which it can connect them to the human experience. As Jim Trelease described:

My children and I have sat in a one-room schoolhouse with Carol Ryrie Brink's *Caddie Woodlawn*, chased monsters with Maurice Sendak and Mercer Mayer, . . . and swallowed magic potions with Judy Blume in *Freckle Juice*. With *James and the Giant Peach* by Ronald Dahl, we crossed the shark infested waters of the North Atlantic; we battled a Caribbean hurri-

cane in Theodore Taylor's *The Cay*. We have searched for wayward brothers and sisters, evaded wolves, lost friends, and learned how to make new ones. We have laughed, cried, shaken with fright, and shivered with delight. And best of all, we did it together. Along the way we discovered something about the universality of human experience—that we, too, have many of the hopes and fears of the people we read about. (1984, p.22)

In addition to reading aloud as a daily activity, time should be preserved each day for students to engage in USSR—uninterrupted, sustained, silent reading. USSR demonstrates that reading is a valued activity in which everyone participates. Students and teachers alike take the opportunity to sit comfortably with a book of their choice.

Both reading aloud and USSR increase children's involvement with books for the sheer pleasure of it. Neither activity should require assigned responses or enforced follow-up activities. However, providing children with a chance to share their reading experiences with each other is another powerful way to encourage a positive attitude toward reading. Class time should be devoted to special interest groups (SIGs). These allow students who enjoy mysteries, adventure stories, or science fiction to gather and talk about their current reading in separate SIG groups. Opportunities to discuss literature help develop and maintain classroom norms that value and celebrate reading.

In a whole language classroom, time is spent on activities that demonstrate the value of reading. In one sixth grade classroom in Salem, Massachusetts, the students generate the ten greatest reading hits each month. The titles, authors, and publishers are posted on banners in the classroom. Minireviews are then published in a newsletter that is shared with the entire sixth grade. There is a great deal of discussion about which books should be included and why. The newsletter is a class project and the reviews are written cooperatively by student trios.

Another sixth grade classroom proudly displays a fish net on one wall with the motto "Get Hooked on a Book." Ensnared in the net are tagboard fish. Each fish has a book title, author, and the name of the student who read the book. The fish are guppies, groupers, and barracudas. Students work to become members of the "Barracuda Club." Ten guppies equal one grouper, and five groupers equal one barracuda. Barracuda club members are part of an oral reading project with the kindergarten and first grade.

Both of these sixth grade classrooms are examples of literate environments, where reading is celebrated, and where positive peer pressure preserves reading as the norm.

Literacy learning is a process. Language learning is a joy when it occurs in a risk-free environment, where children are invited to play with language, to experiment, and to experience. Language is a social activity. Experimenting with language requires opportunities for students to engage with each other. We can't learn language by watching it; we have to be willing participants. We can't expect perfection in form; we have to accept variety and approximation. If students are afraid to make mistakes, they may become nonparticipants. "When the cost of making mistakes becomes too great, children cease to take risks" (Newman, 1985).

The whole language classroom provides a fertile ground where learners can explore and expand, express and engage, experience and experiment with their blossoming literacy.

The whole language future? Our potential lies in the individual, the personal, 'the this is me.' Our potential lies in the partnership, the collaboration, the team support and effort, the 'this is us.' Our potential lies in the stories, those stories lovingly and carefully crafted by authors of literature for children and youth. Our potential lies in the parent, in the administrator, in the researcher, in the theorist . . . but our potential will be realized through the efforts of the teacher with the student.—Dorothy Watson

REFERENCES

- Bellanca, J., & Fogarty, R. (1991). *Blueprints for thinking in the cooperative classroom* (2nd ed.). Palatine, IL: Sky-light Publishing.
- Bereiter, C. (1989, March). The role of an educational learning theory: Explaining difficult learning. In W. McKeachie (Chair), *Toward a unified approach to learning as a multi-source phenomenon*, Symposium at the American Educational Research Association, San Francisco.
- Bettelheim, B. (1976). *The uses of enchantment: The meaning and importance of fairy tales*. New York: Knopf.
- Bird, L. (1987). What is whole language? In D. Jacobs (Ed.), *Teachers networking: The whole language newsletter*, 1(1), 1-3.
- Boorstin, D. (1987). Foreword. In O. Bettmann (Ed.), *The delights of reading* (p. xi-xiii). Boston: David R. Godine.
- Bransford, J., Sherwood, R., Vye, N., & Rieser, J. (1986). Teaching thinking and problem solving. *American Psychologist*, 41, 1078-1089.
- Brown, A. L., Campione, J. C., & Day, J. D. (1981). Learning to learn: On training students to learn from text. *Educational Researcher*, 10(2), 14-21.
- Butler, A., & Turbill, J. (1984). *Towards a reading-writing classroom*. Portsmouth, NH: Heinemann.
- Ceci, S., & Liker, J. (1986). Academic and nonacademic intelligence: An experimental separation. In R. Sternberg (Ed.), *Practical intelligence: Nature and origins of competence in the everyday world* (p. 119-142). Cambridge, England: Cambridge University Press.
- Garner, R. (1990). When children and adults do not use learning strategies: Toward a theory of settings. *Review of Educational Research*, 60(4), 517-529.
- Goodman, K. (1989). Whole-language research: Foundations and development. *The Elementary School Journal*, 90(2), 207-223.
- Goodman, K. (1967, May). Reading: A psycholinguistic guessing game. *Journal of the Reading Specialist*, 6(4), 126-135.
- Goodman, Y., & Burke, C. (1980). *Reading strategies: Focus on comprehension*. New York: Holt, Rinehart & Winston.
- Halliday, M. (1984). Three aspects of children's language development: Learning language, learning through language, and learning about language. In Y. Goodman, M. Haussler, & D. Strickland (Eds.), *Oral and written language development research: Impact on the schools* (p. 165-192). Urbana, IL: National Council of Teachers of English.
- Harste, J. (1989). The basalization of American reading instruction: One researcher responds. *Theory Into Practice*, 28(4), 265-273.
- Iran-Nejad, A., McKeachie, W., & Berliner, D. (1990). The multisource nature of learning: An introduction. *Review of Educational Research*, 60(4), 509-513.
- Lincoln, W. (1990, December 8). *Whole language: Getting your students to love reading and writing*. General Session Address, Learning Institute Course, Philadelphia, PA.
- Newman, J. (1985). *Whole language: Theory in use*. Portsmouth, NH: Heinemann.
- Norton, D. (1983). *Through the eyes of a child*. Columbus, OH: Charles E. Merrill.
- Paris, S., Lipson, M., & Wixson, K. (1983). Becoming a strategic reader. *Contemporary Educational Psychology*, 8(3), 293-316.
- Pearson, P. D., & Dole, J. (1987). Explicit comprehension instruction: A review of research and a new conceptualization of instruction. *Elementary School Journal*, 88(2), 151-165.
- Shuell, T. (1990). Phases of meaningful learning. *Review of Educational Research*, 60(4), 530-547.
- Taba, H. (1962). *Curriculum development*. New York: Harcourt, Brace & World.
- Trelease, J. (1982). *The read-aloud handbook*. New York: Penguin Press.
- Watson, D. (1989). Defining and describing whole language. *Elementary School Journal*, 90(2), 129-142.
- Winograd, P. (1989). Improving basal reading instruction: Beyond the carrot and the stick. *Theory Into Practice*, 28(4), 240-247.

INTERACTIVE STRATEGIES FOR ENHANCING THINKING AND WRITING

Carol Booth Olson

When I first began teaching literature as a graduate student at UCLA, I thought it was my job to guide students toward an "accepted" consensus interpretation of each text. So, with yellow highlighter in hand, I went back through each line or page of the poem, story, play, or novel, carefully framing questions that would enable us to arrive at a place and a reading determined by my previous experience with the text, the readings of my professors—culled from old class notes—and the insights of literary critics. I will even admit to taking a look on a few occasions at that old standby *Cliffs Notes* for an annotation of some obscure textual reference or to see what their interpretation was of something I was feeling rather murky about myself. I did a lot of fishing in those days, fishing for the right answers to what were sometimes ill-framed questions. When the class didn't bite, I would often just answer the question myself so that we could "move on."

In his article "Dialogue with a Text," Bob Probst (1988) tells a story about a battle of wills he once observed between a teacher and her students in a secondary English class. It seems that the students were so troubled by a story they were reading called

"So Much Unfairness of Things" (Bryan, 1979) which deals with a student who succumbs to the temptation to cheat on an exam, that they evaded the teacher's repeated question, "What techniques does the author use to reveal character in this story?" The students talked instead about the moral complexities of the story and its relationship to their own lives. The teacher "tolerated the outpouring for a few brief moments." But, bound and determined to steer the class back toward her own agenda, the teacher finally ordered the class to answer her question: "What techniques does the author use to reveal character in this story? We've had them before," she taunted. "You studied them last year, you know what they are, there are only three—now *what are they?*" When Probst later inquired about why the teacher had felt so compelled to focus on her question rather than on the students' genuine responses, she explained that she had to move on:

There were other stories to cover, other skills and techniques to be learned, and there was to be a test that Friday. They had to be ready for the test. It had to do with the techniques of characterization and it was important. Those kids . . . would be under a

great deal of pressure to pass it, one way or another. They might even be tempted to cheat. (p. 33)

Like the teacher in Probst's story, moving on was very important to me in those early days of teaching, although I can't recall precisely why. It was often, although not always, a laborious journey. But, as I think back, the journey may have been more laborious for me than for my students. After all, I was the one who was painstakingly trudging through each text, giving the guided tour, as it were. Like the teacher in Probst's story, I also did not trust the students' own instinctive responses to texts, nor did I see student collaboration on a shared interpretation of a text as a legitimate goal of the literature classroom. In fact, on more than one occasion I assigned the paper on a work of literature to be due the day before the class discussion so no one could "borrow" any of their classmates' ideas. And, like the teacher in Probst's story, I didn't understand that clinging to one's own agenda and one's own reasonings prevents students from interacting with and thinking deeply about what they read. As Dan Kirby (1992) said, "If you're presenting the central tenets of your content as issues already settled, as truth already known and uncontested, then your students aren't going to be inclined to interact with that content and raise questions of their own. They're going to feel locked away from that content."

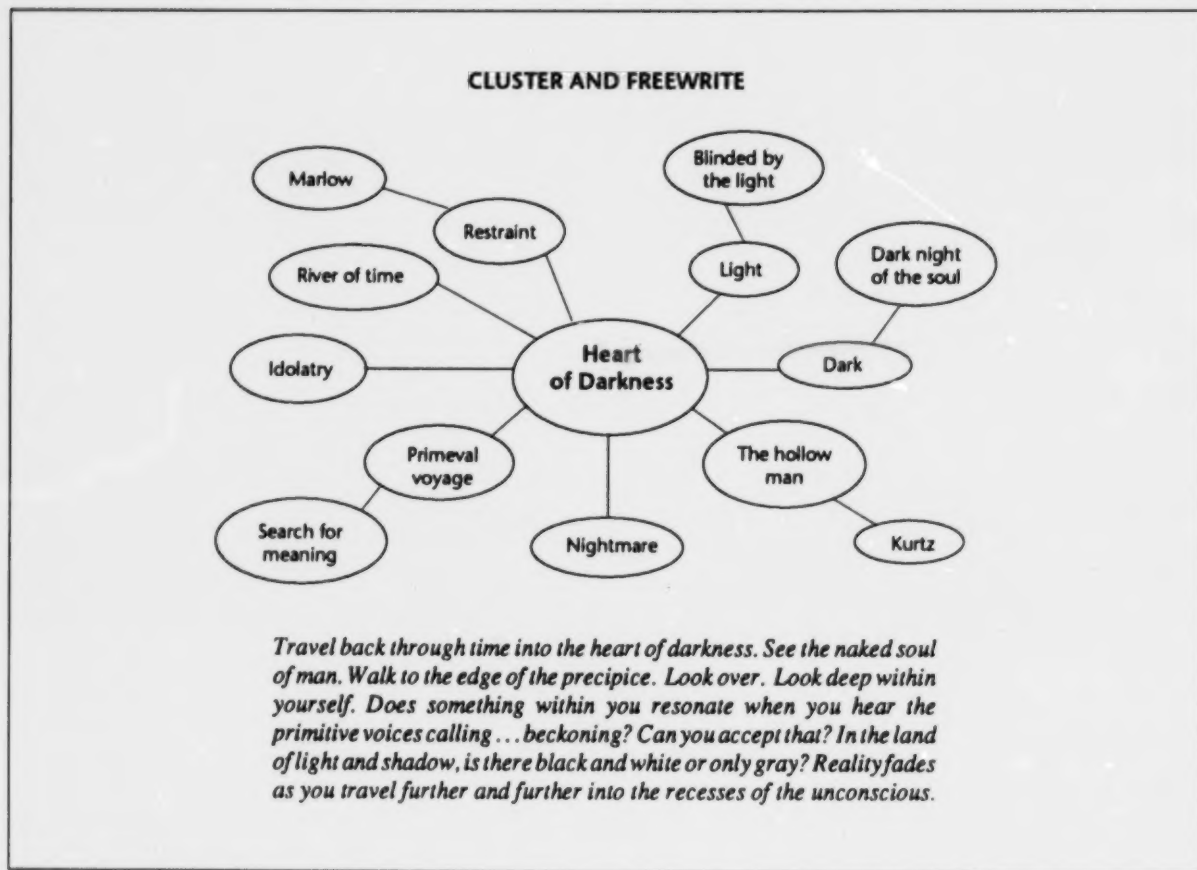
Since I've been exposed to all of the wonderful strategies shared within the National and California Writing Projects, I am much more willing and better able to let students embark on their own journeys through texts and arrive at diverse destinations. I say much more willing because key thinkers in the field of composition and English education, such as Probst, Kirby, and Ann Berthoff, have helped me to redefine learning and literacy and to respect and acknowledge the power of students' responses. I feel better able because the innovative ideas of Gabriele Rico, Jeneé Gossard, Rebekah Caplan, my UCI Writing Project colleagues, and others, have expanded my repertoire of strategies beyond the traditional question-and-answer approach so I can help facilitate students' interactions with texts.

INTERACTIVE STRATEGIES

Below are just a few interactive strategies for enhancing student thinking and writing about literature. Although some of these strategies were originally popularized as tools to facilitate the writing process, teachers have naturally and easily adapted them to enhance the reading process as well. For the purpose of illustrating that these strategies are applicable at all grade levels, the examples feature a wide range of literary works.

As Rico (1992) says, "Clustering is a nonlinear brainstorming activity that generates ideas, images, and feelings around a stimulus word until a pattern becomes discernible." As students cluster around a stimulus word, "the encircled words rapidly radiate outward until a sudden shift takes place, a sort of 'Aha!' that signals a sudden awareness of that tentative whole which allows students to begin writing." Once an exciting "aha," in and of itself, clustering is now an essential and frequently used prewriting strategy for teachers and students alike. But it is also a stimulating idea-generating strategy for thinking, talking, and writing about literature before, during, and after the reading process. Clustering and freewriting about a book title, as in Figure 1, can bring out important themes, issues, questions, and feelings about the text. Clustering characters, settings, events, and symbols can offer students a chance to take a closer and deeper look at a text and to experience some of their own "Ahas."

As described by Berthoff in *The Making of Meaning*, the **dialectical journal** is a double-entry note-taking/note-making process the student can keep while reading literature. It provides the student with two columns that are in dialogue with one another, not only encouraging cognitive responses such as analysis, interpretation, and reflective questioning, but also eliciting affective reactions as well. "The reason for the double-entry format," says Berthoff (1981), "is that it provides a way for the student to conduct the continual 'audit of meaning' that is at the heart of learning to read and write critically." Figure 2 illustrates a note-taking/note-making response to a passage preselected by the teacher from *The Velveteen Rabbit*.

Figure 1 Cluster and Freewrite on *Heart of Darkness*

Note-Taking	Note-Making
"What is real?" asked the rabbit one day. "Real isn't how you are made, it's a thing that happens to you. When a child loves you for a long time, not just to play with but really loves you then you become real!"	Real doesn't come from within; "it isn't how you are made." Real comes from without. It is a gift someone gives to you... They affect the very essence of who you are because of the love they have for you. Real isn't automatic. It happens to you as a result of a process of being loved by another.

From C. Olson, (1992). Strategies for interacting with text. In C. Olson (Ed.), *Practical ideas for teaching writing as a process*, Sacramento: California State Department of Education. Reprinted with permission.

Figure 2 The Velveteen Rabbit

NOTE-TAKING/FACTS	NOTE-MAKING/FEELINGS AND RESPONSES
"I stood there with my hand in a box of Hi-Ho crackers, trying to remember if I rang it up or not." (p. 12)	The sight of the three bathing suited girls is <i>enough</i> to make Sammy lose his concentration?!
"I know it made her day to trip me up." (p. 12)	Negative attitude! He thinks everybody is out to get him?
"Not this queen." (p. 12)	He's singled out one girl—placed her on a pedestal by calling her Queenie. He places her on a pedestal from appearance alone.
"The sheep pushing their carts down the aisle." (p. 13)	What makes him refer to people as sheep? Is he bored with people, seeing them day after day shopping? Is he mad at them?
"I bet you could set off dynamite and all the people would keep checking off oatmeal." (p. 13)	He sees the A & P as a real boring place, boring people making a statement that a bomb wouldn't wake them up.
"Stoksie's married with two babies chalked up on his fuselage already." (p. 13)	Sammy sees Stoksie as already tied up, in this town, this job, this life. He's already caught.
"He thinks he's going to be manager some sunny day." (p. 13)	Is Sammy jealous? Or does he know that Stoksie will never make manager in this place? That nothing happens in this job.

From S. Koff (1992). What the text says: What the text means to me. In C. B. Olson (Ed.), *Practical ideas for teaching writing as a process*. Sacramento: California State Department of Education. Reprinted with permission.

Figure 3 John Updike's "A&P" Dialectical Journal

Figure 3 demonstrates the same process with student-selected entries for John Updike's short story "A & P".

For students who have not had much previous practice responding to literature through a dialectical journal, Gossard suggests reading passages aloud to the class and having students respond in a two to three minute "quickwrite." To facilitate the quickwrite, she puts up a poster with some possible sentence starters as shown below.¹

I wonder . . .
I began to think of . . .
I like the idea . . .
I know the feeling . . .
I noticed . . .
I was surprised . . .

If I had been . . .
I was reminded of . . .

Once students have had practice writing to the teacher's preselected passage and sharing their individual responses with a partner or the whole class, they are better able to begin interacting with a text through the dialectical journal. Gossard provides students with the following information about the kinds of responses readers often have to texts:²

Common Reader Responses

- Feelings (boring, sad, exciting, weird)
- Reactions to characters or events (That Templeton is such a rat!—Ha, Ha.)

- Questions (I wonder why the author put in the boring parts?)
- Images (pictures in the mind, with full sensory response)
- Favorite (or detested) words or parts
- Echoes (of other books, movies, TV shows)
- Memories (people, events, places you've known)
- Connections (to other ideas, people)

These categories can become a springboard for the students' responses to whatever texts they are reading.

Found Poetry

One way to help students examine the language of a work of literature is to ask them to translate what they read into another genre. According to Susan Starbuck, many pieces of good prose are actually "poems" waiting to be "discovered."³ In found poetry students are asked to "find" a poem that is embedded in a piece of professional or student prose. Freed from the constraints of creating the content, students can play with the words and format on the page and rearrange the images that resonate for them. As Starbuck says in the handout she compiled for teacher training workshops, "The result is a new insider's feeling for poetry as you talk about the poetic choices you make and the serendipity you experience as organic forms emerge from the words themselves."

Starbuck suggests that teachers model finding a poem in a prose piece before asking the students to work on their own. You may find her guidelines (also from the handout) helpful:

- Select a piece of prose that you particularly like. It should contain several strong images and some parallel structures. A passage with several prepositions works especially well. (For your students' first experience, select a passage from a work they are reading or with which they are familiar.)
- Underline the words and images that are strongest for you, that are emotionally charged or most essential to the feeling of the passage.
- Now, begin to play with these words and images. Find a satisfying order for them. For example,

- use the lines for emphasis—separate the images so that you have one strong image per line.
 - place the words you think are most important at the ends of the lines.
 - set off powerful single words on lines by themselves.
 - indent lines that give details for other lines.
 - make a "picture" on the page for the eye to follow as it reads the meaning.
 - use whatever parallel constructions you find in parallel forms in your poem—for instance, start all your lines with prepositions, "ing" words, or infinitives.
- Allow yourself to add new words or to change the words if they seem cumbersome or if a new idea begins to emerge for you. Your poem may begin to have a life of its own separate from the initial intention of the text. Let the poem set itself free. Letting go is an important aspect of writing poetry—as is the continuous process you will find yourself doing as you begin playing with form.

Figure 4 illustrates a poem I found in Edgar Allan Poe's "Ligeia." Although I have never experimented with having students transform poems into other genres, it seems to me that the process would work equally well in the reverse. Consider, for example, asking students, after reading Edward Arlington Robinson's poem "Richard Cory," to write a dialogue between two townspeople who heard the news of Richard Cory's suicide. Or after reading Alfred Lord Tennyson's poem "Mariana," ask students to draw the setting and to write a sensory/descriptive prose passage describing the exterior and interior/psychological landscapes in the poem. In all these instances, students must think critically about what they read and make what they read their own by casting the language in another form.

Guided imagery is a technique that enables students to tap their creative imagination and visual thinking skills. While the teacher slowly describes a setting or narrates a story using vivid sensory detail to elicit impressions or images, the students watch

FOUND POETRY—"LIGEIA"

There is one dear topic, however, on which my memory fails me not. It is the person of Ligela. In stature she was tall, somewhat slender, and, in her latter days, even emaciated. I would in vain attempt to portray the majesty, the quiet ease of her demeanor, or the incomprehensible lightness and elasticity of her footfall. She came and departed as a shadow. I was never made aware of her entrance into my closed study save by the dear music of her low sweet voice, as she placed her marble hand upon my shoulder. In beauty of face no maiden ever equalled her. It was the radiance of an opium dream—an airy and spirit-lifting vision more vividly divine than the phantasies which hovered about the slumbering souls of the daughters of Delos. Yet her features were not of that regular mould which we have been falsely taught to worship in the classical labors of the heathen. "There is no exquisite beauty," says Bacon, Lord Verulam, speaking truly of all the forms and genera of beauty, "without some strangeness in the proportion."

Edgar Allan Poe

"Ligela"

Found Poem

Ligela

You strange, exquisite beauty
 You came and departed
 As a shadow
 Wildly divine, spirit-lifting
 You shimmered in the radiance of an opium dream
 Ligela
 He worshipped you
 You placed your marble hand
 Upon his heart
 Awakened his slumbering soul
 Became his dear topic
 His work of art
 Frozen in his memory
 An emaciated statue

Figure 4 Found Poetry

the "movie screens" in their minds—using visualization to develop their own mental pictures of the words they are hearing. While most guided imagery exercises are written by teachers or other professionals and are expressly designed to evoke certain impressions, literature is a rich and often untapped source of visualization. One might say that all literature is a form of guided imagery. However, as Dan Fader points out, many of today's students, conditioned by the pictures already manufactured for them by the television industry, often have difficulty creating their own mental pictures to accom-

pany the text they need.⁴ Ongoing practice visualizing vivid passages from works of literature, such as the one below from *The Velveteen Rabbit*, can help free the imagination and make literature come alive.

And while the Boy was asleep, dreaming of the seaside, the little Rabbit lay among the old picture books in the corner behind the fowl-house, and he felt very lonely . . . He thought of those long sunlit hours in the garden—how happy they were—and a great sadness came over him. He seemed to see them



From C. B. Olson's *Strategies for interacting with a text*, in C. B. Olson (Ed.), *Practical ideas for teaching writing as a process*. Sacramento: California State Department of Education, 1992. Reprinted with permission.

Figure 5 Guided Imagery Drawing

all pass before him, each more beautiful than the other, the fairy huts in the flower bed, the quiet evenings in the wood when he lay in the bracken and the little ants ran over his paws; the wonderful day when he first knew that he was Real. He thought of the Skin Horse, so wise and gentle, and all that he had told him. Of what use was it to be loved and lose one's beauty and become Real if it all ended like this? And a tear, a real tear, trickled down his little shabby velvet nose and fell to the ground.

And then a strange thing happened. For where the tear had fallen a flower grew out of the ground, a mysterious flower, not at all like any that grew in the garden. It had slender green leaves the color of emeralds, and in the center of the leaves a blossom like a golden cup. It was so beautiful that the little Rabbit forgot to cry, and just lay there watching it. And presently the blossom opened, and out of it there stepped a fairy.

She was quite the loveliest fairy in the whole world. Her dress was of pearl and dewdrops, and there were flowers round her neck and in her hair,

and her face was like the most perfect flower of all. And she came close to the little Rabbit and gathered him up in her arms and kissed him on his velveteen nose that was all damp from crying.⁵

Moreover, asking students to respond to a guided imagery experience by drawing what they saw, as in Figure 5, will often bring to the surface important images that can be discussed.

Reader's Theater

Reader's theater is a way of dramatically rendering a text as if it were a play, thus bringing it to life in the classroom. The text can be scripted for the students, as Julie Simpson has done with Richard Wilbur's short story "A Game of Catch" in Figure 6, or students can choose the roles and write out the lines themselves. The same passage can be read or performed by more than one group of students. This allows the class to see how the lines have been interpreted and, therefore, read with more or less feeling, delivered in different tones of voice, and accompanied by different movements, by different groups.

A GAME OF CATCH

by Richard Wilbur

READERS

ON: Omniscient Narrator

G: Glennie

GN: Glennie's Narrator

S: Scho

SN: Scho's Narrator

M: Monk

MN: Monk's Narrator

ON: Monk and Glennie were playing catch on the side lawn of the firehouse when Scho caught sight of them. They were good at it, for seventh-graders, as anyone could see right away. Monk, wearing a catcher's mitt, would lean easily sidewise and back, with one leg lifted and his throwing hand almost down to the grass, and then lob the white ball straight up into the sunlight. Glennie would shield his eyes with his left hand and, just as the ball fell past him, snag it with a little dart of his glove. Then he would burn the ball straight toward Monk, and it would spunk into the round mitt and sit, like a still-life apple on a plate, until Monk flipped it over into his right hand and, with a negligent flick of his hanging arm, gave Glennie a fast grounder.

They were going on and on like that, in a kind of slow, mannered, luxurious dance in the sun, their faces perfectly blank and entranced, when Glennie noticed Scho dawdling along the other side of the street and called hello to him. Scho crossed over and stood at the front edge of the lawn, near an apple tree, watching.

G: "Got your glove?"

GN: asked Glennie after a time. Scho obviously hadn't.

S: "You could give me some easy grounders,"

SN: said Scho.

S: "But don't burn 'em."

G: "All right,"

GN: Glennie said. He moved off a little, so the three of them formed a triangle, and they passed the ball around for about five minutes, Monk tossing easy grounders to Scho, Scho throwing to Glennie, and Glennie burning them into Monk. After a while, Monk began to throw them back to Glennie once or twice before he let Scho have his grounder, and finally Monk gave Scho a fast, bumpy grounder that hopped over his shoulder and went into the brake on the other side of the street.

S: "Not so hard,"

SN: called Scho as he ran across to get it.

M: "You should've had it,"

MN: Monk shouted.

From J. Simpson's reader's theater adaptation, University of California at Irvine Writing Project.

Figure 6 A Game of Catch

Showing, Not Telling

Like clustering, the concept of "showing, not telling," is well known to most teachers. As Caplan (1987) explains, the assumption behind showing, not telling, is that most students have not been trained to show what they mean. Showing, not telling, encourages students to dramatize their writing with specific details that paint pictures in the reader's mind. It involves giving students a "telling sentence" such as: *The room was vacant* or *The lunch*

period was too short. The teacher then asks students to expand the thought into an entire paragraph. Students are challenged not to use the original statement in the paragraph. Rather, they must show that the room was vacant without making the claim directly. Giving students telling sentences about plot, setting, characters, and symbols in works of literature is a great way to prompt them to reflect on and interact with the text. For example, see the telling sentence in Figure 7 on the charac-

TELLING SENTENCE: "LENNIE'S MIND IS NOT RIGHT."

Towering over all like a giant, ignorant of his strength, Lennie crushes the life out of the objects of his affection like so many paper dolls. And then he looks at George, helplessly, questioningly, burning with shame because he has done another bad thing and terrified that there will be no more soft, fuzzy creatures to fondle. He's kind of like those puppies he smothers with love—filled with need, anxious to please, obedient to his master. George just shakes his head and wonders what's to become of them. "Tell me again about the rabbits!" The broken record is stuck on the same groove. Lennie smiles dreamily as the nightmare unfolds—oblivious to all but the pretty picture in his head.

From: C. B. Olson (Ed.) (1992). A Lesson on Point of View That Works. In *Practical ideas for teaching writing as a process*, p. 115, California State Department of Education. Reprinted with permission.

Figure 7 Telling Sentence

ter Lennie from John Steinbeck's *Of Mice and Men*. Asking cooperative learning groups to generate their own telling sentences about a work of literature for another group to "show" is also an excellent way to stimulate discussion.

Time Line

A time line is a graphic representation of a sequence of events or activities. In the study of literature, developing time lines often helps students reconstruct and reflect on what happened in the text. I got this idea from Joni Chancer, a teacher/consultant from the South Coast Writing Project at the University of California at Santa Barbara. Ask students to write positive (+) events above the time line and to write negative or problematic (-) events below the time line. For example, see the portion of a time line from "The Moon Lady" chapter of Amy Tan's *The Joy Luck Club* represented in Figure 8. This task causes a great deal of animated discussion and sends students back to the text as they discuss their varying interpretations of events. Students may also wish to illustrate their time lines with pictures and symbols.

Venn Diagram

Venn diagrams are overlapping circles often used in mathematics to show relationships between sets.

In language arts instruction, Venn diagrams are useful for examining similarities and differences. In responding to literature, Venn diagrams can be especially helpful for comparing and contrasting such items as characters, themes, and settings. For example, see Figure 9 for an analysis of Roger and Mrs. Louella Bates Washington Jones in Langston Hughes' short story "Thank You, Ma'am."

Creating Venn diagrams can help students understand not only the similarities and differences between characters, but also the nature of their relationships. Characters who at first glance seem to be polar opposites, may have more in common when explored in this manner. Relationships that appear to be "give" on one side and "take" on the other also may be viewed as more mutual upon closer inspection.

These are just a few of the strategies students might use to interact with a text. The nature of that interaction can be between an individual student and a text, between student partners and a text, between small groups and a text, between any of the aforementioned student groups, a text, and a teacher facilitating large-group discussion, and so forth. I would suggest using these strategies sparingly, allowing enough time for the students to discuss their responses fully. As Probst said, if one of our goals is to help students "make their own

CREATING THE THOUGHTFUL CLASSROOM

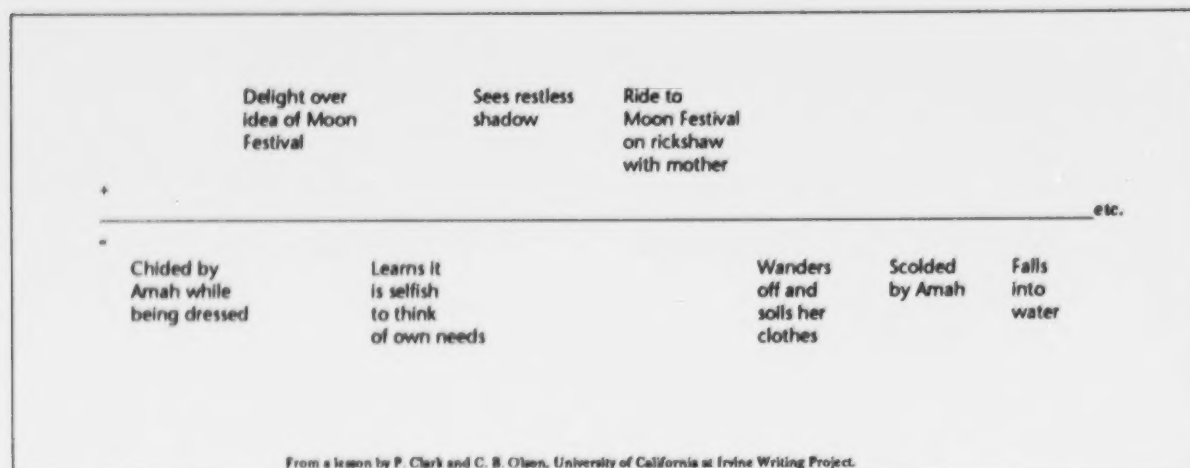


Figure 8 Timeline

sense of texts," we must give students time to articulate their thoughts and help them find links between their reactions (1988, p. 35). I have had success with assigning small groups a strategy and with allowing each group to choose the technique that most interests them. Each group also had an opportunity to share its reflections with the whole class.

A PROCESS APPROACH

The strategies I have described for interacting with texts can be used independently as relatively brief, expressive reading/thinking/writing activities that help students make their own meaning from texts. Or they can be combined into a set of guided invitations to help students experience the text from

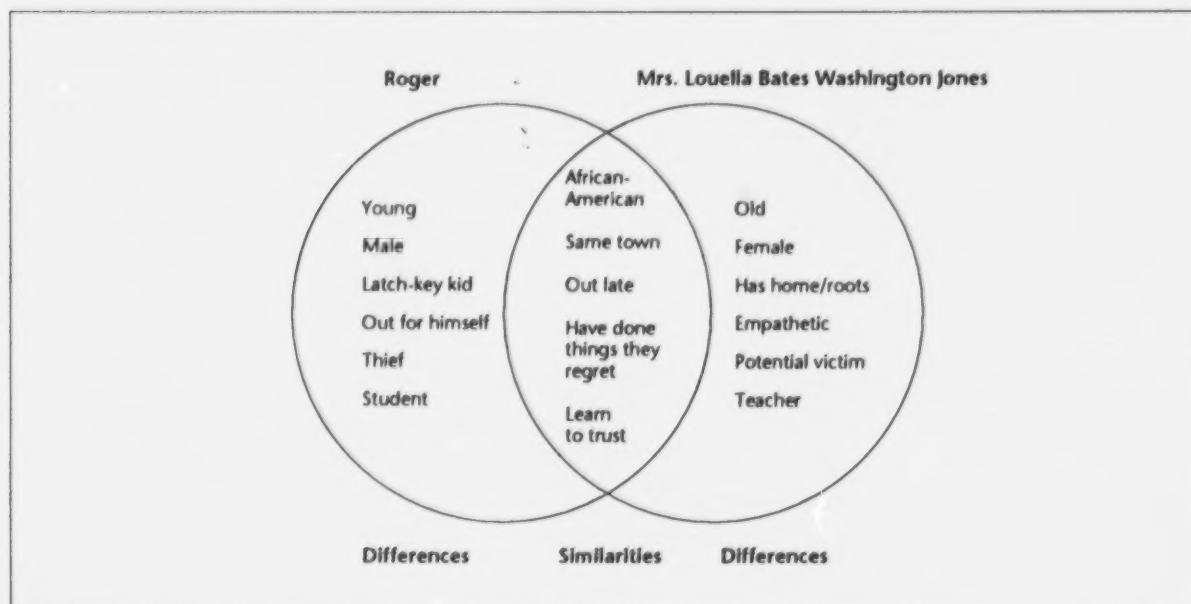


Figure 9 Venn Diagram

different perspectives as they work through a more sustained writing process. For example, the piece of writing may be intended to have multiple drafts and to be turned in and/or "published" in the class as a finished product.

The following discussion on Lynne Cherry's book *The Great Kapok Tree: A Tale of the Amazon Rain Forest* illustrates how one might sequence a number of interactive strategies as students work toward a particular writing goal. While the sequence provided here is teacher guided, students who are given opportunities to practice and internalize these strategies can easily determine which ones will assist them as they work with self-selected topics.

The Great Kapok Tree

The Great Kapok Tree may not be as familiar to readers as the other titles I have referred to in this chapter. Beautifully written and illustrated by Cherry, it is the tale of a man who enters the rain forest with orders to chop down the great Kapok tree. While the animals silently watch him from their hiding places among the branches, the man begins to chip away at the massive tree trunk: "Whack! Chop! Whack! Chop!" Soon, overcome with the heat and humidity of the forest and the hard labor of his task, he puts down his ax, sits beneath the tree for a short rest, and quickly falls asleep. While he slumbers, the animals who live in the tree come down, one by one, and present their case, as it were—whispering arguments into the sleeping man's ear about why the great Kapok tree should be spared. When he awakes, the man sees his surroundings in a new light, drops his ax, and walks out of the rain forest. Although his book was written for children—probably most suitable for grades four and up, but if read, understandable to younger students—I have used it successfully with adults. I believe it touches that sense of wonder, that child, in all of us.

Before reading the book, ask the students to cluster and freewrite what they know about rain forests. A sample cluster and freewrite might look like the web in Figure 10. Asking students what they already know about the rain forest—which may diverge greatly from one student to the next—helps

the teacher assess the prior knowledge of the class. But also, it is a good opportunity for students, sharing their clusters in pairs or small groups, to add to each other's knowledge bank. The class also can come up with a list of questions that could be used to form their own agendas for a unit of study on the rain forest.

Reader's Theater

The Great Kapok Tree is ideal for a reader's theater because the whole class can participate. There are thirty parts overall—one omniscient narrator, two pantomime parts for the two men in the story who do not speak, and twenty-seven parts for the omniscient narrators of the animals and the animals themselves. The numerous roles allow participants to be up, out of their seats, performing the story and experiencing the impact of the words firsthand. With small children, I suggest numbering a set of cards one to thirty and numbering the text accordingly. Then hand out the cards to the students. For example, a child assigned to number nine can turn to the place where number nine occurs in the story and assume the part of the macaw. The teacher may wish to play the part of the omniscient narrator or assign it to a strong reader since that part has the most text. An excerpt from the reader's theater follows:

Omniscient Narrator: *Soon the man grew tired. He sat down to rest at the foot of the great Kapok tree. Before he knew it, the heat and the hum of the forest had lulled him to sleep.*

Boa Constrictor's Narrator: *A boa constrictor lived in the Kapok tree. He slithered down its trunk to where the man was sleeping. He looked at the gash the ax had made in the tree. Then the huge snake slid very close to the man and hissed in his ear.*

Boa Constrictor: *Senior, this tree is a tree of miracles. It is my home, where generations of my ancestors have lived. Do not chop it down.*

Bee's Narrator: *A bee buzzed in the sleeping man's ear.*

Bee: *Senior, my hive is in the Kapok tree, and I fly from tree to tree and flower to flower collecting pol-*

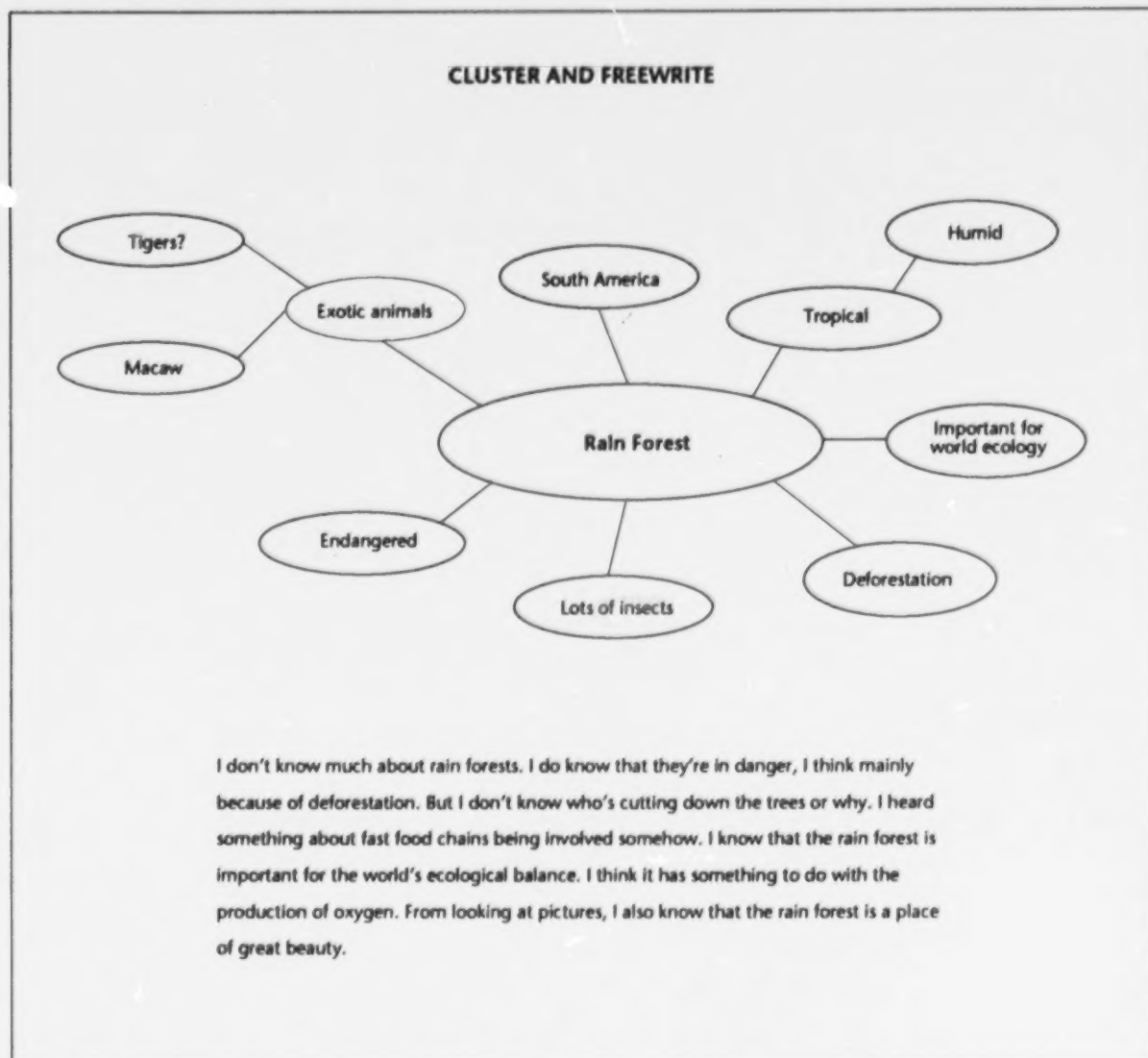


Figure 10 Rain Forest Cluster and Freewrite

len. In this way I pollinate the trees and flowers throughout the rain forest. You see, all living things depend upon one another.

Prewriting: Clustering

After students have completed the reader's theater, ask them to use a different color of ink to add information to their rain forest cluster. Encourage them to use the text as a resource to add to the cluster what they learned from the reader's theater. A cluster might look like the one in Figure 11.

Prewriting: Showing, not Telling

After students add to their original cluster, ask them to do a ten-minute quickwrite to the following telling sentence: *When the sleeping man awoke, he saw the rain forest with new eyes.* Here is my sample showing, not telling, paragraph:

He slowly disentangled himself from the embrace of the deep sleep that the hum and the heat of the forest had lulled him into and began his journey through the layers of consciousness toward awaken-

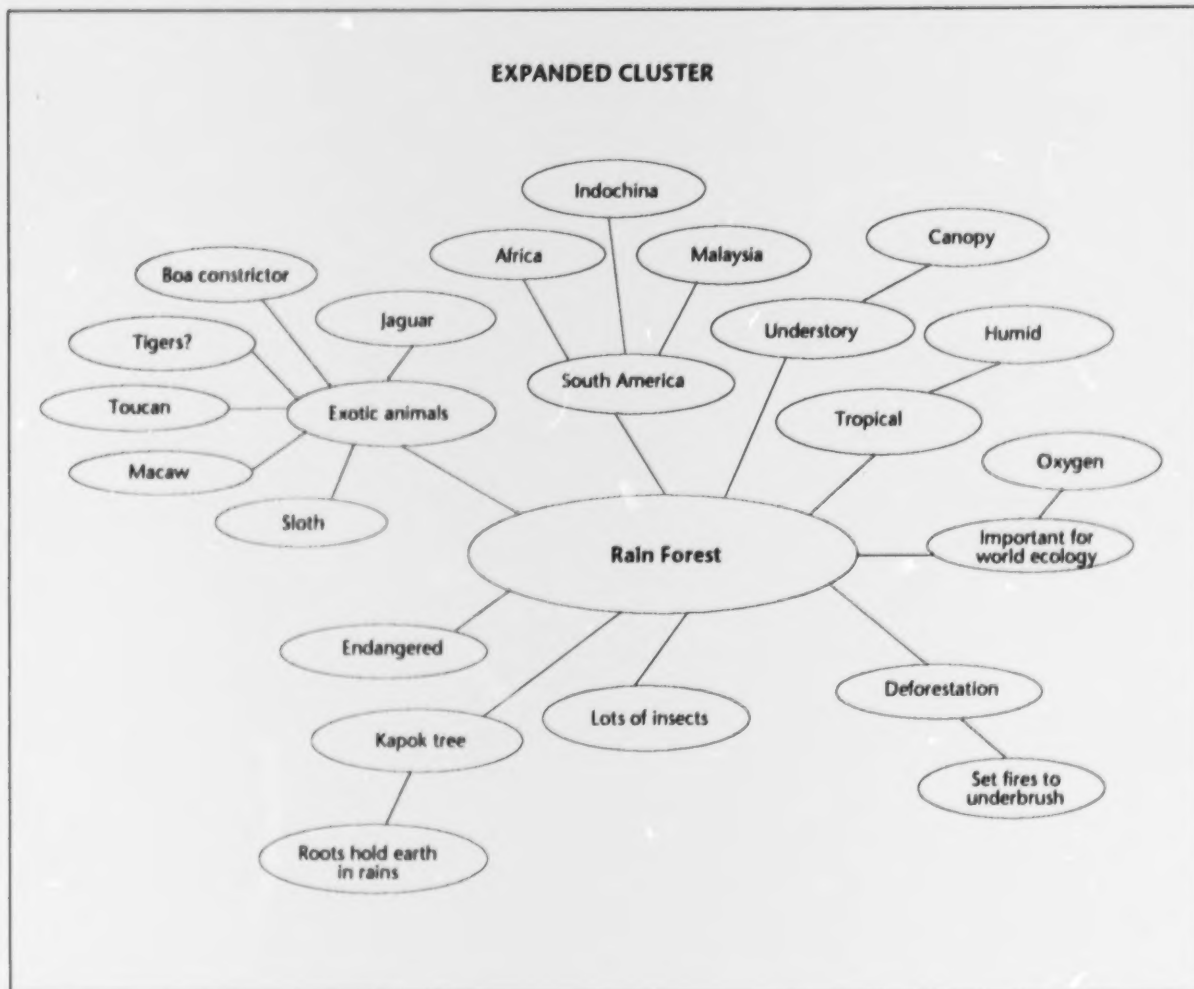


Figure 11 Rain Forest Cluster Expanded

ing. Strange whispers and murmurs echoed in his mind: "Senior, how much is beauty worth? Can you live without it?" He rubbed his eyes and shook away the thought. Suddenly, the fragrant perfume of the crimson flowers that had been his pillow caught his attention. He breathed in and savored their sweetness for a moment before opening his eyes and gazing upon the sunlight, which was streaming in through the canopy. He had never noticed how the sunlight mingled with the darkness, causing a dance of light and shadow upon the thick verdant vines and colorful flowers that hung from the limbs of the great tree, which he was in the midst of chopping down. Quiet . . . It seemed oddly quiet. As he

lowered his gaze, he understood why. All the wondrous creatures of the rain forest were watching and waiting, talking to him with their eyes. The thought echoed again: "Senior, how much is beauty worth? Can you live without it?" And a response welled up inside his body, "No I can't," he said to himself, "I can't live without beauty."

WRITING

Although the showing, not telling, prewriting activity can be revised and shared as a finished product, it can also lead to a number of different writing

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options the students can choose from. A few of these options are provided below.

Sensory/Descriptive Writing

Students can "find" a poem in *The Great Kapok Tree* or in their showing, not telling, piece. One precomposing strategy to assist with this writing task is to give students a yellow highlighter and ask them to underline the "golden lines" in the book or in each other's paragraphs. These lines can then be rearranged into a found poem. Students also enjoy finding a group poem composed of a golden line from the work of each writer which they can then transfer onto poster board and illustrate.

Imaginative/Narrative Writing

Students can speculate about what happens when the sleeping man leaves the rain forest and encounters the man who ordered him to cut down the great Kapok tree. They can then write a dialogue between the two men. The wood cutter can explain why he decided not to complete the task he was sent into the rain forest to do. As a precomposing strategy, you might want students to keep a dialectical journal in which they collect and reflect on the creatures' various arguments for sparing the tree.

Practical/Informative Writing

Students can write a report about some aspect of *The Great Kapok Tree* that sparked their interest. As a precomposing strategy, students might want to cluster the questions that arose for them while reading the story. Here are some sample questions students might choose to research.

- Who is Chico Mendes, and how did he give his life in order to preserve the rain forest?
- What is a Kapok tree, and is it native only to the rain forest?
- How does the rain forest produce oxygen?
- What animals live in the rain forest, and how does their habitat contribute to their survival?
- Does the sloth live only in the rain forest? What are its characteristics?
- What is the Yanomano tribe, and how does it depend on the rain forest?

Analytical/Expository Writing

Students can compose an essay about what they learned from the animals in *The Great Kapok Tree*, including why the tree is essential to all the creatures living in or around it. Again, as a precomposing strategy, students might turn either to clustering or to a dialectical journal.

Writer's Choice

Students can self-select a topic to write about. They might even choose to do a project, such as a mobile, sculpture, game board, or diorama, with a written description of what they created and why. For example, to show the interdependence of the animals in the rain forest, one student in the elementary language arts methods class at the University of California at Irvine created a puzzle out of the great Kapok tree, showing how all the pieces fit together.

All of the writing tasks described above can be shared at the rough-draft stage, revised, edited, possibly evaluated, and published in some way. Because the students have experienced the text and responded to it in a variety of ways, their investment will, most likely, be greater and their writing richer.

Letting Go of Leading the Guided Tour Through Literature

According to Kirby and Kuykendall (1991), "Reforming your teaching to nurture thinking involves more than dreaming up new activities or offering students more freedom." This new view of knowledge, "doesn't mean you have nothing to teach students or that textbooks are no longer important or that old knowledge is no longer valuable." What it does mean "is that we have to plan for and structure our classes in such a way that students construct their own versions of knowledge in new and personal ways." And allowing students to construct their own versions of knowledge in more personal ways means that you, as a teacher, have to allow students to embark on their own journeys through texts and possibly arrive at destinations that may be unfamiliar to you.

As I watch students interacting with the literature and with each other, I find their own, fresh questions and concerns replacing my prepackaged

ones. I no longer lead the guided tour through the text. My students' own responses lead the way.

NOTES

1. Jenee Gossard's list of sentence starters comes from the hand-out she uses while conducting workshops on reader response logs. It was influenced by Audre Allison's work with reading logs as described in *Through Teachers' Eyes: Portraits of Writing Teachers at Work* (Portsmouth, NH: Heinemann, 1986).
2. Gossard's common reader response categories come from her article "Reader Response Logs," which appears in C. B. Olson (Ed.), *Practical Ideas for Teaching Writing as a Process* (Sacramento: California State Department of Education, 1991 edition).
3. Susan Starbuck is an English teacher at Polytechnic High School in Long Beach, California, and is a teacher/consultant for the UCI Writing Project. Several of Susan's articles appear

Interactive Strategies for Enhancing Thinking and Writing

- in C. B. Olson (Ed.), *Practical Ideas for Teaching Writing as a Process*, (California State Department of Education, 1987). Although Susan has popularized found poetry among Writing Project teachers in our area, we were introduced to the concept by Marian Mohr, a teacher/consultant from the Northern Virginia Writing Project and author of *Revision: The Rhythm of Meaning* (Boynton/Cook Publishers, 1984).
4. Dan Fader made the point about the imaging problems of children who have grown up as part of the television generation at a workshop at the University of California at Irvine in 1984. He is a professor of English at the University of Michigan and the author of *Hooked on Books* (Berkeley Publishing corporation, 1966).
 5. M. Williams, *The Velveteen Rabbit* (Philadelphia, PA: Running Press, 1981). Alfred A. Knopf Publishers has an audio version of *The Velveteen Rabbit* that is narrated by Meryl Streep. The audiotape of Streep's narration and George Winston's piano accompaniment is also especially effective for this guided imagery exercise.

REFERENCES

- Berthoff, A. (1981). *The making of meaning: Metaphors, models and maxims for writing teachers*. Montclair, NJ: Boynton/Cook.
- Bryan, C. D. (1979). So much unfairness of things. In H. McDonnell, et al. (Eds.), *Literature and life* (pp. 342-367). Glenview, IL: Scott Foresman.
- Caplan, R. (1987). Showing, not telling: A training program for student writers. In C. B. Olson (Ed.), *Practical ideas for teaching writing as a process* (pp. 51-56). Sacramento, CA: California State Department of Education.
- Caplan, R. (1984). *Writers in training: A guide to developing a composition program*. Palo Alto, CA: Dale Seymour Publications.
- Cherry, L. (1990). *The great Kapok tree: A tale of the Amazon rain forest*. San Diego: Harcourt, Brace, Jovanovich.
- Gossard, J. (1992). Reader response logs. In C. B. Olson (Ed.), *Practical ideas for teaching writing as a process*. Sacramento: California State Department of Education.
- Kirby, D. (1992). Reforming your teaching for thinking. In C. B. Olson (Ed.), *Practical ideas for teaching writing as a process*. Sacramento: California State Department of Education.
- Kirby, D., & Kuykendall, C. (1991). *Mind matters: Teaching for thinking*. Portsmouth, NH: Boynton/Cook Publishers, Heinemann Educational Books.
- Koff, S. (1992). What the text says: What the text means to me. In C. B. Olson (Ed.), *Practical ideas for teaching writing as a process*. Sacramento: California State Department of Education.
- Olson, C. B. (Ed.). (1992). *Practical ideas for teaching writing as a process*. Sacramento: California State Department of Education.
- Olson, C. B. (1992). *Thinking/Writing: Fostering critical thinking through writing*. New York: Harper Collins.
- Poe, E. A. (1967). Ligeia. In E. Carlson (Ed.), *An introduction to Poe: A thematic reader* (pp. 210). Glenview, IL: Scott Foresman.
- Probst, R. (1988, January). Dialogue with a text. *English Journal*, 77(1), 32-38.
- Probst, R. (1987). *Response and analysis: Teaching literature in junior and senior high school*. Portsmouth, NH: Boynton/Cook Publishers, Heinemann Educational Books.

CREATING THE THOUGHTFUL CLASSROOM

Rico, G. L. (1992). Clustering: A prewriting process. In C. B. Olson (Ed.), *Practical ideas for teaching writing as a process*. Sacramento: California Statement Department of Education.

Rico, G. L. (1983). *Writing the natural way: Using right brain techniques to release your expressive powers*. New York: J. P. Tarcher.

Updike, J. (1962). *Pigeon feathers and other stories*. New York: Alfred A. Knopf.

Williams, M. (1981). *The velveteen rabbit*. Philadelphia: Running Press.

CONVERTING AT-RISK STUDENTS INTO REFLECTIVE LEARNERS

Stanley Pogrow

Education is at a critical turning point. The current concern with the development of more advanced skills can either be a boon or a disaster for the students who have been placed at risk. It is easy to provide thinking-in-content activities to these students. It is another matter to get them to the point where they can succeed in these activities to the full extent of their true intellectual capability—which is extensive. Furthermore, a common approach for developing students' thinking skills may result in a widening of learning gaps between at-risk and "regular" students. Developing the thinking skills of at-risk students to the point where they can be successful in thinking-in-content activities requires a different approach than for other students.

The purpose of this article is to share the conclusions I have reached about the development of thinking skills in students who have been placed at risk. These conclusions are based on my large-scale work with such students over the past ten years. Many of these conclusions are counter-intuitive, and most contradict conventional wisdom. However, interventions based on these conclusions have proven to be very effective.

THE KEYS TO CONVERTING AT-RISK STUDENTS INTO ACADEMIC LEARNERS

Converting at-risk students, many of whom read two to three years below grade level, into reflective academic learners is a formidable task. My research suggests that this goal can be achieved with a substantial number of these students if the following three key components can be brought together: an outstanding curriculum, outstanding teaching, and students with a predisposition to being reflective. Indeed, this combination is so powerful that it is effective even if it is provided for only a small part of the day. Unfortunately, putting this combination together is not as easy as it sounds—particularly since the criteria for the first two keys are not just "good," but "outstanding."

In order to understand the issues involved in bringing the three keys together, it is important to define what is meant by each of them.

Outstanding Curriculum

An outstanding curriculum is one which is consistently interesting to students and which uses a more discovery/Socratic approach to teaching and

learning that effectively teaches content. With this type of curriculum, students are intrigued and are consequently stimulated to explore the content under study. Students learn partly as a result of their own curiosity. Instead of telling students what to do, teachers inquire about what has been found.

It is not clear what percentage of a given curriculum should have these characteristics. Those who say that all learning should involve thinking are misguided. The learning of facts is still important, and the best way to learn many series of facts is still rote memory. The best way to get students to learn the numbers table is still to provide an incentive for students to endure the repetitive practice necessary to learn it. However, there is probably an optimal way to combine thinking and rote learning so that even the thinking activities contribute to the learning of formal content facts. For example, I am currently developing a mathematics curriculum for grades six through eight. It will be designed in such a way that students discover many of the mathematical algorithms through experiments conducted on computers. Once the students have discovered key procedures they will then go through a drill on how to apply them. (It is not determined what the ratio of experimentation to drill should be. That will be determined by experimentation.) Rather than substituting thinking activities for content coverage, the goal for this curriculum (to be called HOTS-math) is to use discovery techniques to increase content learning.

It is far more difficult to design outstanding curricula than most realize. While it is easy to design thinking activities, it is much harder to design thinking activities that lead to systematic knowledge acquisition. It is also hard to design thinking activities that captivate students on an ongoing basis—particularly at-risk students, who are often difficult to motivate. Indeed, it is so difficult to develop outstanding curricula that the thousands of articles and speeches advocating a child-centered approach for middle schools and calling for thinking curricula have resulted in many efforts to develop those new curricula. It is easier to advocate the use of outstanding curricula than to develop

them or to deal with the reality of whether or not they exist. Indeed, there are very few middle school curricula available which are both creative and oriented to the development of thinking, and whose effectiveness has been validated. I have just started a survey of available middle school curricula to identify the exemplary ones. There are very few, and in some fields none at all. To indicate how few outstanding curricula have been developed in recent years, the highest rated mathematics curriculum in my survey is seventeen years old. None of the new curricula were as good.

It is so difficult to develop appropriate forms of curricula that it is not reasonable to expect teachers to do it. While teachers can, of course, develop specific occasional units, they cannot be expected to develop curricula that maintain intensive and interesting thinking environments consistent with key developmental and cognitive development theories. Good teachers are performers whose job it is to teach—not to develop curricula. The quality of a good actor and actress is their ability to perform Shakespeare—a previously written work. They are not expected to write a play of equivalent quality first.

Unfortunately, most curriculum specialists continue, unrealistically in my view, to advocate that teachers develop their own curricula. I suspect, however, that anyone who has ever set out to develop an outstanding curriculum will quickly come to the same conclusion that I have.

Outstanding Teaching

The near absence of adequate curricula is the first stumbling block in converting the at-risk student into a reflective learner. But even if there were appropriate types of curricula, there would be problems in providing appropriate forms of supporting teaching techniques. Seeing a Shakespeare play can either be a dull or a scintillating experience, depending on whether the actors are skillful enough to capture the nuances and the passions of the characters they portray. It is the same thing with a thinking environment. The most creative and reflective curriculum can be turned into rote learning by inadequate teaching. There is much talk that teachers should "teach as a process" and

that they should "use a discovery mode." But what specifically do those things mean? What specific teaching behaviors are involved in such teaching? Can these behaviors be taught? Can they be learned—and if so by what kind of teachers?

Given an appropriate curriculum, the key to creating a reflective environment is in the way teachers talk and listen to their students. In most classrooms, the way teachers talk and listen to students follows a specific scenario: Teacher speaks many words, asks a question, gets a series of one-word answers, and acknowledges the correct one—and then the cycle starts over again. Teachers generally acknowledge the correct answer by repeating it and elaborating it. The amount of student talk, and understanding, is minimal.

The conversation taking place in the typical classroom is a ritual geared to getting students to accept what the teacher says is the correct answer rather than a process that promotes understanding. The ritual is particularly unhelpful for at-risk students, who generally do not have a good understanding of abstract concepts. (This matter will be discussed in more detail in the section on the students' predisposition to think.) Indeed, it is striking how little classroom dialogue promotes understanding. At-risk students frequently tell me that they are stupid, because the answers they are thinking of are not the ones that the teacher says is correct. These students have no notion why the supposedly correct answer is correct; why their answer is wrong—or even if it is wrong; that there can be more than one right answer; or how one arrives at answers which are judged "right" by teachers. To them it is a magic game, the rules of which they do not understand.

It is far more difficult to produce understanding in students than most realize. It requires a shift from a directive mode of teaching to a more Socratic one. The former is characterized by high levels of teacher talk, much of it devoted to telling students what to do, while the latter involves teaching by asking questions. In a Socratic environment the teacher is quizzical rather than authoritative. The goal is to ask the types of follow-up questions that lead the students to construct understanding on their own. It is only through extensive experience in constructing their own un-

derstanding under adult prodding that students can even come to develop a sense of what understanding is.

Developing the ability of even the best teachers to teach in a Socratic manner is a far more difficult process than is generally realized. Why it is so difficult, however, is something that I still find hard to put into words. You have to see someone try to teach Socratically to realize how hard it is to ask appropriate probing follow-up questions. The question must follow logically from the student's prior response, but it cannot be too specific (as that will provide an obvious clue), nor can it be too general (as to provide no stimulus to the student to rethink the initial answer). It is only when you watch a teacher trying to teach this way that you truly come to realize how hard it is.

After ten years' experience in training teachers to be Socratic, it is clear to me that it is possible to train Socratic instincts in teachers—but only under specific conditions. Training consisting primarily of philosophic advocacy about the importance of teaching Socratically is useless. A detailed system of specific techniques must be developed. (An example of such a system is contained in Pogrow, 1990b.) This system must be taught and practiced in the context of an exemplary curriculum. Teaching Socratically is so difficult that weak, or even average, teachers cannot be consistently Socratic.

Additionally, there has to be follow-up observation of the trained teacher. There is a world of difference between most teachers' perceptions of whether they are being Socratic and the reality. Self-reporting is a poor indicator of the degree of Socratic technique being employed by a given teacher. Indeed, the more sure teachers are that they are being Socratic, the higher the probability that they are being overly directive. A really good Socratic teacher understands that there is a very fine line between being directive and being Socratic. It is a matter of a few words said at the wrong time or in the wrong way. He or she also understands that it is as hard to tell which side of the fine line her words come out on as it is to tell how one's voice truly sounds to one's audience. You need a tape recorder for the former, and a trained observer for the latter.

Finally, it is impossible for even the best teacher to maintain a Socratic environment in a regular size class, particularly one in which a high percentage of students do not have a predisposition to think through ideas.

Students With a Predisposition to Think

With that last observation we have come full circle. It is probably impossible to convert at-risk students into successful academic learners without extensive experience in a Socratic environment, and at the same time it is nearly impossible to maintain the needed Socratic environment in regular size classes with a high percentage of at-risk students. So what can be done?

Even if you do provide exemplary teaching and content to at-risk students, that will not be sufficient to convert them into successful academic learners. The evidence for the inadequacy of good curricula and good teaching by themselves is the failure of the discovery-oriented curricula of the 1960s and early 1970s. Many good discovery-oriented science curricula were developed by the National Science Foundation (NSF) during the period. One of the goals of these curricula was to develop the interest and skills in science of inner-city disadvantaged youth. That goal was largely a failure. While officials at NSF are convinced that these earlier attempts failed largely because of inadequate teacher training, I do not think that was the case. I was teaching in an inner-city school at the time, and remember the frustration of the science teachers. These were good, well-trained, conscientious teachers. Yet, they would come back to the teacher room every day and say something like: "They (the students) are not responding. It's like I am talking a foreign language to them!"

Why did the inner city students not respond to a high-quality discovery curriculum and good teaching? After eight years of successful work with disadvantaged students, I refer to them as students who do not understand "understanding." At-risk students do not seem to know how to deal with unstructured types of learning, with generalizations, or with ambiguity. They seem incapable of dealing with more than one concept at a time, having a

conversation about ideas, thinking in terms of general principles instead of specific examples, and thinking ideas through. They view each piece of information as a discrete entity that only applies to the context in which it was learned. They do not seem to understand how to generalize, or that they are even supposed to generalize. They simply do not know how to work with ideas, and do not know what understanding is.

To teachers, this phenomenon manifest itself as students' inability to even begin the process of internalizing abstract ideas. When faced with this phenomenon, teachers are reduced to making the age-old request: "Please think!" This request usually elicits blank stares. The failure to communicate is all the more tragic, because each party desperately wants to communicate with the other—yet neither is capable. From the students' perspective, the teacher is in fact speaking a foreign language—the language of symbolic understanding.

It is only after the curriculum becomes more complex—after the third grade—that this understanding deficit manifests itself. Basic techniques help the at-risk student up to the third grade, and are then unable to stop a precipitous plunge of their scores thereafter. Once the curriculum becomes more complex, the only way to enhance learning is to deal with this understanding deficit. Overcoming this deficit requires an understanding of the causes of the problem.

That at-risk students do not understand "understanding" is not their fault. Nor is it an indicator of a problem with their intellect, or a function of their race, ethnicity, or economic class. It probably results from the failure of the adults in their lives to model the thinking process for them. Such modeling has typically been done through sophisticated conversation at the dinner table and in school. Conversation of this kind, however, is increasingly rare. Given the growing number of students coming from poor single-parent households, there is almost no conversation in the homes of most at-risk children—let alone conversations about constructing meaning. It is not so much that no one is teaching them how to think, but rather that no adult is asking them to develop and explain ideas

and rationales. No one is asking them questions, and then asking "why?" when the child responds. Most at-risk students have literally never had opportunities to construct meaning on their own—not at home, nor in school. In school these students are generally told what to do. In my observations of classroom processes, one is struck by how little conversation exists in classrooms—even in small-group settings.

The absence of adequate interaction with adults leads to a profound understanding deficit. So what is the solution? Conventional wisdom is to provide thinking-in-content activities. Unfortunately, students who have major problems in constructing meaning will not be able to succeed in sophisticated thinking-in-content activities. Individuals who watch tapes of HOTS students are amazed at how primitive their reasoning skills are. There is simply no way that these students can successfully engage in sophisticated thinking-in-content activities at that stage of development. Even the best classroom teachers cannot cope with a substantial number of students who have understanding deficits in their classrooms.

Research by Charles Brainerd and Valery Reyna at the University of Arizona has led to the conclusion that rote learning and thinking are independent (Reyna & Brainerd, 1991) and antagonistic (Brainerd & Reyna, 1991) learning processes. Thus, energy devoted to one of the forms of learning detracts from the other. If this research is valid, it makes sense, at some point, to provide specific help in automating the basic thinking processes assumed by content learning. It is only when such processes have been automated that they do not interfere with acquiring content knowledge.

Providing thinking-in-content activities to at-risk students is the wrong approach and will widen learning gaps. Those students who understand understanding will do better, and those who do not will continue to stare at teachers. This fact not only explains why disadvantaged students did not respond to the science initiatives of the 1960s and 1970s, but also why they do not seem to be responding to more recent reforms. Middle schools have adopted many innovations over the past ten

years. Yet, none really seem to reduce the at-risk problem. It is not that techniques such as cooperative learning and whole language are bad. It is just that they are not powerful enough to overcome this deficit. Nor can occasional thinking experiences overcome the understanding deficit. Producing the major cognitive change needed requires an intensive process:

- **35-minute Principle** Overcoming the understanding deficit requires two years of sophisticated general thinking activities in small group settings at least four days a week for at least thirty-five minutes a day.
- **Theory of Cognitive Underpinnings** At-risk students must first be placed in general thinking activities for one to two years before being put into sophisticated thinking-in-content activities.

Nor will any general thinking program have such effects. For example, "teaching" general thinking strategies will not work. These strategies will, like all the other information in the student's mind, be stored as disjointed ideas. A social process approach to thinking is needed. The curriculum must create situations where the students come to experience the need to think, and begin to share their perceptions of the thinking process with each other. While it is much harder to create this type of curriculum, it is believed that a social experiential approach to thinking is more appropriate for students who do not understand understanding. This type of curriculum is consistent with the theories of L. S. Vygotsky, who concluded that problem solving must first be practiced in a social setting before it can be integrated into the cognitive structure of the mind. The best approach is to recreate the social process of dinner table conversation. Recreating dinner table conversation in curricular form requires directed and mediated conversation. In such conversation, how the adult talks and responds to the child's ideas serves as an indicator of how adults use information. A major component of this conversation is to create situations around which problems can be posed and student efforts to respond can be critiqued in a coaching, nurturing way. It is important that the situations be such that students come to real-

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ize *on their own* the need to clarify a particular process or some information in order to respond to a problem posed by an adult.

The goal is to create an ongoing, powerful learning environment in which students begin to discover thinking through the social process of having adults react to their ideas. It is not a process of adults teaching something, but rather of reacting to students' ideas and students' attempts to construct meaning. By experiencing adults reacting to their ideas in a consistent way, students slowly begin to get a sense of what it means to understand something.

These conversations should not be linked to regular classroom content. These conversations mirror the ad hoc style in which parents use general events as an opportunity to query their children. The questions at a dinner table revolve around what happened that day. These questions and subsequent discussions develop a sense of what understanding is. Instead of a dinner table, and discussions about events of the day, HOTS uses computers, and discussions about what happened on the computer screen the previous day.

While overcoming the understanding deficit requires an extensive dose of general thinking experiences, our research demonstrates extensive benefits. Not only do thinking skills and social confidence improve, basic skill gains are double the national rate. In addition, 10-15% of the at-risk students start to make the honor roll. Once the powerful engines in their minds start to turn over, they can be successful in thinking-in-content activities. The key is to combine this knowledge into a practical plan.

PUTTING THE KEY COMPONENTS TOGETHER

Given the problems of providing any one of the three key components of outstanding curricula, outstanding teaching, and at-risk students predisposed to thinking, providing all three at the same time requires a carefully designed plan. It is not feasible to provide all three under conventional approaches to school improvement. Conventional wisdom advocates overall school improvement—that is, an effort to improve all teachers and

courses. While such a diluted thrust will in fact improve some teachers and courses, it is too much of a hit or miss proposition for the at-risk student. Under such an improvement plan, at-risk students could go through three years of middle school without ever having all three components at the same time—let alone having them come together for a sufficient period of time to convert them into successful thinking-in-content learners.

The planning technique that has been devised for having all the components come together in a substantive way is called "Focused Centers of Excellence." Instead of trying for overall improvement, this planning technique creates pockets of excellence in a phased-in approach. The first component of the plan is to provide the students with sufficient and appropriate general thinking activities to develop students' sense of understanding and the predisposition to think. The second component is to have follow-up exemplary thinking-in-content courses available that are as good as can be created under existing knowledge—as good as any that can be found in an outstanding private school. The first component is provided using a general thinking program such as HOTS, in accordance with the 35-minute principle and the theory of cognitive underpinnings, to get at-risk students ready to benefit from the second component. In other words, the general thinking activities should be provided in small-group settings for as much as two years prior to the students being placed in the second component.

IMPLEMENTATION PROBLEMS

Implementing the Focused Centers of Excellence model is not as easy as it seems. The first problem is fiscal. Providing two years of small group general thinking activities to all at-risk students in a school is an expensive process. Ideally, class size should be limited to nine students per teacher or fifteen per teacher and aide. The smaller class size is generally funded through federal compensatory funds such as Chapter 1 and Special Education funds. A key problem arises in the middle school model in districts that spend all the federal funds at the elementary level. At that point, there probably are not sufficient district funds to cover the cost of

providing intensive general thinking training to middle school at-risk students.

The other key problem in implementing the first phase is in obtaining top-quality teachers for the general thinking program. Not all principals can identify who the top-quality teachers are, and not all are willing to allocate them to such programs. As one principal of a large, embattled, urban middle school told me, "I only have four outstanding teachers in my school; how can I allocate two to the general thinking effort without creating problems elsewhere?" That is a valid concern. At the same time, however, a dynamic principal can use the development of the general thinking program as a carrot to recruit more good teachers to the school.

The biggest problem in establishing exemplary content courses is in picking the content area and teachers wisely. It must be a content area that has a core of excellent teachers who willingly agree to offer a new type of course, and who all agree to teach in a Socratic fashion. Depending on the size of the middle school, each exemplary course at a given grade level can require one to four excellent teachers. It requires a principal who knows and cares about good teaching, and is willing to be honest in deciding which teachers to approach about participating in the exemplary course. Average teachers will simply not be successful.

Identifying the right content area and teachers is not as easy as it sounds. It requires that a school has a core of excellent teachers in a given content area. It also requires a willingness to have them focus on offering consistent quality in one course. That will of necessity weaken other courses. However, once the success of at-risk students in the exemplary courses is demonstrated, there will be a greater receptivity to change on the part of the other teachers, which will then lead to greater opportunity for a more broad-based improvement.

The biggest problem with implementing the Focused Centers of Excellence approach may be tradition. This systematic proposal goes against the grain of tendencies to seek across-the-board solutions. The notions of a general thinking phase applied to one group of students, followed by a limited set of exemplary content courses is very counter-intuitive to a field brought up on the rhetoric

of overall improvement, treating everyone equally, improving the entire school at once, and integrating thinking into all content.

The HOTS program has successfully countered the political instincts of the field to remedy the at-risk student, and to link such remediation to the classroom curriculum by first demonstrating success on a limited scale before attempting to network the ideas on a large scale. The experience with the HOTS program has demonstrated that there is a large group of educators who are willing to implement nontraditional approaches once evidence is available that the approach works. The same approach can work with the Focused Centers of Excellence model.

The bottom line is that most educators recognize that conventional approaches are not working and are eagerly seeking better solutions. It is possible to get novel ideas adopted if developers do the hard work of designing better solutions and then carefully demonstrate their advantage.

Why Just One Exemplary Course Per Grade Level?

The most widely asked question about the thinking-in-content component is: "Why limit the exemplary thinking-in-content courses to just one per grade level? Why not have more?" The answer is that it would be nice to have more, but realistically it is so hard to do one substantively that it doesn't make sense to try and do more. In addition, it may not be necessary to have more. One *great* course per day is enough to inspire and sustain the intellectual process. When asked: "How many of your middle or junior high teachers do you remember as having inspired an interest in learning?" most adults will remember only one or two teachers. In other words, it only takes a few outstanding educational experiences to inspire a student to chart a lifelong course of learning. The Focused Centers of Excellence plan insures that there is one such course per day in every student's schedule.

In addition, an excellent educational experience has tremendous cognitive impact on the at-risk student—even if it is sustained for only a small part of the day. The effects of an excellent curriculum combined with excellent teaching is enormous. Given my findings that general thinking for 35

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minutes per day has a large effect on overall student learning, it is anticipated that just one exemplary thinking-in-content course can also have significant effects (Pogrow, 1990a). (The extent of such effects will be analyzed in future research with the urban middle schools project.)

The most important end goal is the stimulation of the intellectual ability of the at-risk student. If that can be done better with a few excellent courses than with many mediocre courses, then that is what schools should do. It is time to go beyond rhetoric and focus the limited available resources of good curriculum and good teaching into a few exemplary educational experiences that are carefully phased in over three or four years.

CONCLUSION

At-risk students have tremendous problems along with tremendous potential. It is possible to turn their problems around by the end of the middle school years. The at-risk student can become successful in exemplary academic courses. Yet, the problem of the at-risk student will not be solved with general rhetoric and advocacy. General proposals to eliminate tracking, improve all teaching, integrate thinking into all content, restructure, and spend more money are either not sufficient, not necessary, or harmful. A more systematic, and focused, approach is needed.

Bringing about substantial change for students who do not understand understanding requires a carefully orchestrated intervention. At-risk students cannot benefit from occasional, ad hoc exposure to thinking activities, as the student who already understands understanding can. Helping the at-risk student requires bringing together exemplary teaching, exemplary curricula, and students who have had several years of appropriate general thinking development. Unfortunately, while it is practical to bring this combination together, a realistic appraisal of schools as they exist (as opposed to a romanticized view) suggests that it is difficult.

The simple reality is that the typical urban middle school has a significant percentage of teachers who are not capable of successfully teaching exemplary curricula, and a small percentage who are. It is also very hard to find and develop exemplary curricula. The only possible solution is to bring the available kernels of excellence together and distribute them judiciously as opposed to letting them float around in a haphazard manner. If we can carefully bring together enough kernels to provide two years of general thinking activities, followed by one exemplary thinking-in-content course per year, we can convert at-risk students into successful academic learners.

REFERENCES

- Adey, P. (1989, July). *Cognitive acceleration through science education*. Paper presented to the Learning to Think/Thinking to Learn conference sponsored by the Organization for Economic Development, Paris.
- Baron, J., & Sternberg, R. (1987). *Teaching thinking skills: Theory and practice*. New York: W. H. Freeman.
- Brainerd, C. J., & Reyna, V. F. (1991). *Memory independence and memory inference in cognitive development*. Manuscript submitted for publication.
- Gagne, E. D. (1985). *The cognitive psychology of school learning*. Boston: Little, Brown.
- Pogrow, S. (in press). What to do about Chapter 1: An alternative view from the street. *Phi Delta Kappan*.
- Pogrow, S. (1991). A validated approach to thinking development for at-risk populations. In C. Collins & J. Mangieri (Eds.), *Building the quality of thinking in and out of schools*. Hillsdale, NJ: Lawrence Erlbaum Associates.

- Pogrow, S. (1990a). Challenging at-risk students: Findings from the HOTS program. *Phi Delta Kappan*, 71(5), 389-397.
- Pogrow, S. (1990b). *HOTS (Higher-Order Thinking Skills): Using computers to develop the thinking skills of students at risk*. New York: Scholastic.
- Pogrow, S. (1990c). A learning drama approach to using computers with at-risk students. In C. Wagner (Ed.), *Current Issues in Technology*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Reyna, V. F., & Brainerd, C. J. (1991). Fuzzy trace theory and children's acquisition of scientific and mathematical concepts. *Learning and Individual Differences*, 3, 27-60.
- Vygotsky, L. S. (1989). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press.

MULTIPLE INTELLIGENCES THEORY: CREATING THE THOUGHTFUL CLASSROOM

Noel White, Tina Blythe, and Howard Gardner

Sophia roams around her kindergarten classroom, teasing classmates and disrupting games until it's her turn during story time. Then she becomes quickly absorbed in long and intricate tales of her own making. Rui, shy and inarticulate in his seventh grade English class, performs gracefully and compellingly in the school play. Lynn can't focus on any math problem for more than thirty seconds, but practices basketball for hours with methodical concentration, discipline, and dedication. They are puzzling, these students—and classrooms teem with them. Their inconsistent performances defy easy labels such as "under-achiever," "slow," and "learning disabled." Their strengths belie the less-than-satisfactory grades that cover their report cards. As these students become older and their schools more departmentalized, the chances that their teachers will see and value their particular strengths decrease dramatically. Even if he or she doesn't "catch" a student in some moment of greatness, a teacher who has to give a failing mark often does so with the nagging sense that the student is smarter than the grade indicates.

How do we begin to make sense of the peaks and valleys in these students' abilities? How do we address their failures in the classroom? Is there a

way—or even a reason—to recognize and reward their strengths? Can such recognition further the cause of the traditional goals of public schooling, namely reading, writing, and arithmetic?

For their appealing answers to such difficult questions, the alternative theories of intelligence espoused by Robert Sternberg (1985), Stephen Ceci (1990), David Feldman (1986), and others have been gaining popularity in educational circles. Despite their differences, these theories all assert that humans exhibit intelligent behavior in a wide variety of ways. People are not simply "smart" or "dumb." They vary in their intellectual strength depending on the context in which they are working. In the cases of Sophia, Rui, and Lynn, these theories might suggest that nothing is wrong with the students, but rather they have talents that traditional classrooms seldom tap. Educational standards do not have to be lowered for them, but should be expanded to offer a wider variety of opportunities for success. Teachers have not failed, but they may need to direct their talents to a diversified curriculum. At the same time, these students' strengths, once identified, could be used in the service of more traditional goals. This chapter explores some of the ways the theory of "multiple

intelligences," developed by Howard Gardner and colleagues, has been used to approach traditional schooling from a more complex and, we argue, a more fruitful perspective.

MULTIPLE INTELLIGENCES THEORY

Gardner's theory of multiple intelligences maintains that we all possess several different and independent capacities for solving problems and creating products (Gardner, 1983, 1991a). Gardner and his colleagues gleaned the evidence for these capacities, or "intelligences," from many varied sources: empirical work with normal and gifted children; investigations of brain-damaged adults; and studies of idiot savants, prodigies, and other special populations. These data yield evidence for at least seven discrete domains of human achievement.

Linguistic intelligence involves not only ease in producing language, but also sensitivity to the nuances, order, and rhythm of words. Poets exemplify this intelligence in its mature form. Students who enjoy playing with rhymes, who pun, who always have a funny story to tell, who quickly acquire other languages—including sign language—and who write copious notes to their friends in class all exhibit linguistic intelligence.

Logical-mathematical intelligence entails the ability to reason either deductively or inductively, and to recognize and manipulate abstract patterns and relationships. Scientists, mathematicians, and philosophers all rely on this intelligence. So do the students who "live" baseball statistics or who carefully analyze the components of problems—either personal or school-related—before systematically testing solutions.

Musical intelligence includes sensitivity to pitch, timbre, and rhythm of sounds, as well as responsiveness to the emotional implications of these elements. While composers and instrumentalists clearly exhibit this intelligence, so do the students who seem particularly caught by the birds singing outside the classroom window, or who constantly tap out intricate—if irritating—rhythms on the desk with their pencils.

Spatial intelligence is the ability to create visual-spatial representations of the world and to transfer those rep-

resentations either mentally or concretely. Well-developed spatial capacities are needed for the work of architects, sculptors, and engineers. The students who turn first to the graphs, charts, and pictures in their textbooks, who like to "web" their ideas before writing a paper, and who fill the blank space around their notes with intricate patterns are also using their spatial intelligence.

Bodily-kinesthetic intelligence involves using the body to solve problems, to create products, and to convey ideas and emotions. Athletes, surgeons, dancers, choreographers, and crafts people all use bodily-kinesthetic intelligence. The capacity is also evident in students who relish gym class and school dances, who prefer to carry out class projects by making models rather than writing reports, and who pitch their crumpled papers with annoying accuracy and frequency into wastebaskets across the room.

Interpersonal intelligence is the ability to understand other people, to notice their goals, motivations, intentions, and to work effectively with them. Teachers, parents, politicians, psychologists, and salespeople rely on interpersonal intelligence to carry out their work. Students exhibit this intelligence when they thrive on small-group work, when they notice and react to the moods of their friends and classmates, and when they tactfully convince the teacher of their need for extra time to complete the homework assignment.

Intrapersonal intelligence is personal knowledge turned inward to the self. This form of intellect entails the ability to understand one's own emotions, goals, and intentions. Although it is difficult to assess who has this capacity and to what degree, evidence can be sought in students' uses of their other intelligences—how well they seem to be capitalizing on their strengths, how cognizant they are of their weaknesses, and how thoughtful they are about the decisions and choices they make. The two personal intelligences are, perhaps, the hardest to observe and, at the same time, are the most important to success in any societal domain.

Along with positing these seven capacities, Multiple Intelligences theory makes some important assertions about the way these intelligences develop and manifest themselves.

First, every normal individual possesses all seven intelligences, but in varying degrees of strengths. Each person exhibits a unique intellectual profile with preferred methods of approaching and solving problems. Thus, a standardized approach to education faces the serious problem of inevitably neglecting many students. Sophia, Rui, and Lynn, for example, would have scant opportunity to make use of their strengths in a traditional classroom, where certain aspects of linguistic and logical-mathematical intelligence are regnant while other forms of intelligence are largely ignored.

Second, intelligences are educable. Although determined to some extent by genetic predisposition, the development of intelligences is also a matter of culture and education. Traditionally, our culture has valued language and logic skills, so it has developed educational curricula and methods that favor students gifted in these two domains. According to Multiple Intelligences theory, even students not gifted in these domains can improve, but they may need to begin by drawing on their stronger intelligences. Lynn, for example, might sit easier in math class if the work involved opportunities to play with physical representations of problems or the manipulation of basketball statistics rather than isolated numbers. And if we decide to value other skills, they too can be accommodated and educated within our schools.

Third, each intelligence can be mobilized for a variety of tasks and goals. For example, Sophia's linguistic intelligence enables her to tell stories and to invent the rhyming nicknames with which she teases classmates. Furthermore, intelligences almost never operate in isolation; most goals and tasks involve a number of intelligences working together. For example, Sophia's storytelling reveals her linguistic abilities as well as her bodily-kinesesthetic and logical intelligences. This is evidenced in her manipulation of the toy figures she uses to represent a story's characters and in her creation of a cause-and-effect plot for her stories.

Fourth, intelligences manifest themselves in specific domains with particular types of materials and problems. A person cannot develop fully or assess accurately one intelligence through the medium of another. For instance, a student's musical intelli-

gence cannot be developed merely by discussing music—although, if the student is linguistically gifted, talking could be a good place to start. At some point, the student will need to experiment with the tools of the domain—for example, by playing an instrument, composing a melody, or beating a rhythm. By the same token, assessing the student's progress in music cannot be done solely through pencil-and-paper short-answer tests.

THEORY INTO PRACTICE

The particulars of Multiple Intelligences theory are not set in stone. Further research may modify our description of intelligences, may suggest different labels, or may identify altogether new intelligences. But these particulars are not as important as the basic implication that intellectual development involves more than a single, genetically determined capacity. This basic understanding complicates our picture of the factors at play in any educational setting. If we examine school through the lens of Multiple Intelligences theory, the typical classroom becomes a complex web of numerous strengths, weaknesses, opportunities, and dead ends. Students do not simply vary from one to another; they vary along several different dimensions. Teachers, too, are strong in some intelligences but not others, and they need to engage students who, for the most part, bear intelligence profiles different from theirs. When viewed through Multiple Intelligences theory, the standard curriculum itself has fortes, such as language and logic, and deficiencies—for example, many capacities receive only cursory acknowledgment in the form of gym, art, and music classes. All of these—students, teachers, and curriculum—interact in ways that are complicated, sometimes productive, and sometimes not.

Given this complex picture of school, Multiple Intelligences theory suggests educational practices that diverge considerably from the current push toward standardization of curriculum, pedagogy, and assessment. In particular, Multiple Intelligences theory calls for broadening the school curriculum to emphasize the divergent paths students can take toward understanding and for diversifying assessment. The following pages de-

scribe some examples of how these ideas might play out in the classroom.

BROADENING THE SCHOOL CURRICULUM

If students are to develop the full range of their potential, they need to be exposed early and often to a wide variety of activities and materials. Only the most gifted prodigies can develop their talents to any extent in the absence of external encouragement. One suspects, for example, that Mozart would have found a way to make music even if his father hadn't himself been an ambitious musician. However, Sophia might never have discovered, much less developed, her ability to create stories had not her teacher given her the time and the encouragement to do so.

In order to create a model for enabling very young children to explore their various intelligences and interests, multiple intelligences researchers worked with teachers to develop Project Spectrum (Krechevsky & Gardner, 1990b). In a Spectrum classroom, students visit "learning centers," where they can choose freely from a variety of hands-on activities that permit them to experiment with the materials of each domain. For example, imaginative figures and story boards aid students in storytelling, engaging their linguistic abilities. Sorting and assembling simple mechanical devices allows for the development of spatial and bodily-kinesthetic skills. Throughout the year, the teacher makes notes about which activities students gravitate toward, as well as the progress they make in working with the various materials. At the year's end, the teacher produces a report that details each student's intellectual profile and offers suggestions for activities which would encourage a child's strengths and shore up that child's weaknesses.

Of course, it is important for students—not just their parents and teachers—to understand their own intellectual profiles. Toward this end, activities involving reflection need to accompany these explorations. In Spectrum classrooms, students as young as four years old are asked to identify the activities that they like most, as well as the ones they

think they do best. Older students write in journals, create charts, or discuss their strengths with other students. Such reflection fosters the development of intrapersonal intelligence, a capacity that enables students to draw more readily on their strengths when solving future problems.

Self-knowledge is not the only benefit of a more inclusive curriculum. Motivation is another important byproduct (Csikszentmihalyi, 1990). Students who are encouraged to develop their strengths are more likely to enjoy their work and to persevere when they encounter difficulties in these domains. Such perseverance and the attendant increase in the students' skill builds both confidence and competence for dealing with more complex problems as they arise.

MULTIPLE PATHS TO UNDERSTANDING

Broadening the curriculum does not imply that traditional goals need to be disregarded. However, Multiple Intelligences theory does suggest that there may be more than one way to achieve those goals. Because each student has different strengths for experiencing the world, a presentation of the curriculum which emphasizes only language and logic will not be equally successful for all students. Each student will thrive depending on how he or she experiences the new materials. Some students need visual and physical representations of concepts. Some students prefer abstract mind-work. Some need ideas explained verbally in several different ways. Some students benefit when a classmate explains materials. Some work best when given the opportunity to play for some time with materials, as in a science lab, before they discover the key information. Others want to be told the answer directly.

Making the match between the standard curriculum and each student's proclivities is not easy, but progress can be achieved with the efforts of teachers and students. Teachers can take an active role by shaping their presentations of the curriculum to fit the needs of a wider range of students. Experienced and successful teachers often cater to a range of students by teaching each part of the curriculum in many different ways. They tend to revisit

a key concept or theme often and with variations to provide several opportunities for students to approach a concept from different perspectives. In Multiple Intelligences terms, this variety provides the multiple paths to understanding necessary to engage the multiple intelligences that students bring to the classroom.

A Project Approach

One of the most common and most effective ways to provide multiple opportunities for students to use their strengths is through working on projects (Gardner, 1991b). Projects can allow students to choose topics or approaches that fit their interests (Olson, 1988). Projects also provide opportunities for extended work with peers, which develops interpersonal skills. Given the opportunity to present their information in forms other than writing, students can develop and display musical, spatial, and kinesthetic skills.

Public elementary school teachers in Indianapolis, Indiana created The Key School around Gardner's Multiple Intelligences theory. It makes projects an important part of each student's experience. Students in the Key School learn about multiple intelligences and are required to take regular classes in physical education, computers, art, music, and a foreign language, as well as the standard reading, writing, and arithmetic. They draw on these diverse experiences to create three major projects each year. Several elements of the projects encourage students to draw on and to develop multiple intelligences: the Key School's general course-work, which feeds into the projects; the encouragement to be creative and personal in developing projects; working on projects for extended periods of time; cooperating with others; performing or presenting their projects to classmates; and documenting the process and product on videotape, which captures much more than written documentation. With its focus on extended projects that emphasize a range of skills, including linguistic, musical, and interpersonal, the Key School has a lively and productive atmosphere. It differs enormously from schools that emphasize practice for written, standardized tests of language and logic. Students at the Key School acquire the

"basic skills" required of public education, but they do so through multiple paths that take advantage of their personal and creative energies.

Teachers, school curriculum, and administrators are not the only ones responsible for matching student intelligences with curricular goals. Students can be encouraged to take some of the responsibility for shaping their school experience. Students can learn to adapt the curriculum to their needs, and to use their own strengths to better serve the demands of school. Most students stumped by a writing assignment or dismayed by the prospect of failing yet another math exam might give up or might overcome the difficulty only if the teacher intervenes. The student who approaches an assignment as if there is only one way to go about the task has little hope once stuck. Students with the perspective of multiple intelligences have a better chance by understanding that there are many approaches to writing and a variety of ways to gain insight into math. If students have had the opportunity to learn something about their own intelligences, then they have a better chance to find approaches that will work for them when facing tough assignments.

Training Practical Intelligence

The difficulty is that not all students know they can take responsibility for their learning by drawing on their own strengths and interests, and not all students know how. Put another way, some students have "practical intelligence." That is, they understand themselves well enough to know how their own ways of working are unique, and they understand school well enough to recognize how they can best utilize personal abilities—and overcome disabilities—to fit the varying demands of school tasks. Many students, however, do not possess the practical intelligence that would allow them to maneuver successfully through their school careers. The Practical Intelligence For School project (PIFS) developed curricular materials to help students take more responsibility for their learning (Krechevsky & Gardner, 1990a; Walters, Blythe, & White, in press).

Many efforts—generally called study skills curricula—already exist to teach practical skills. The PIFS project differs from these efforts in several

respects. Study skills curricula often help when and where students do not need it, disconnected from their daily schoolwork. Proceeding on Multiple Intelligences theory's assertion that intelligences manifest themselves in specific domains with particular types of materials and problems, PIFS lessons consider practical knowledge in the context of the academic problems students face daily. Practical intelligence is not something more to be learned on top of reading, writing, and arithmetic. Rather, practical skills such as being organized, managing time, understanding one's best work styles, and understanding the school system at large are integrally mixed with and complicated by the process of learning these subjects. Study skills curricula often present single or simple solutions to complex problems, thereby failing to serve the needs of many students. Following Multiple Intelligences theory, the PIFS curriculum gives students opportunities in the course of their regular lessons to recognize that they have unique ways of going about schoolwork. In this manner, PIFS lessons help students establish personal, workable solutions to their own difficulties.

DIVERSIFYING ASSESSMENT

An important part of any plan to encourage a variety of abilities and to provide multiple paths between those abilities and the standard curriculum, is the broadening of assessment conceptions (Gardner, 1990a). Even educators who appreciate their students' different needs and strengths often give grades that credit only a narrow range of skills, mainly those that exploit language and logic. The scope of assessment can be expanded without severely altering classroom culture. Common school experiences, such as science laboratories and social studies projects, can be supplemented with notebooks, journals, portfolios, review conferences, videos, or other kinds of records. These supplements broaden the focus of both teachers and students. The most common student products, such as tests, papers, and oral presentations, highlight mainly linguistic and logical skills. Such products leave out other important skills students

may have and which certainly are important for students' overall growth.

To examine how assessment can include a wider range of intelligences, the Arts PROPEL project, a collaboration among Harvard Project Zero, the Educational Testing Service, and Pittsburgh Public Schools, has done considerable work toward making portfolios a practical and educational part of the classroom (Gardner, 1990b). By building portfolios over time, PROPEL classes encourage an examination of the evolution and range of students' thinking. Documenting the process that students undertake when they write, paint, or prepare for tests, these assessments generate more opportunities to recognize and encourage strengths that may not be evidenced in the final product (Winner et al., in press).

Building on the notion of portfolios, but taking care to focus on more than polished final products, Arts PROPEL calls its assessment devices "processfolios." A processfolio is a record of learning that captures a student's process of creation. The activity of focus may be in any domain: music, drama, science, English, history, or the like. Processfolios can include pieces that represent different styles, mastery of specific skills, and examples of pivotal works in progress. Unlike tests, processfolios can preserve examinations of problems that students find important, that may have several answers, or that require original and sustained research (Wolf, 1988). The Arts PROPEL processfolios sample a wide range of skills, among them are craft, pursuit (revision and development over time) expressiveness, inventiveness, self-assessment, use of criticism, the capacity to make distinctions among works, awareness of physical properties of materials, ability to work independently or collaboratively, and use of resources. Students develop critical intrapersonal and interpersonal skills by reviewing their processfolios with the teacher and with one another. Classrooms involved with the Arts PROPEL project recognize and encourage a larger range of student talents than classrooms relying only on such assessments as standard written tests and papers.

On a smaller scale, classes that extensively feature the informal assessments naturally integrated

into activities, such as class discussions, self-monitoring, small-group work, and peer reviewing, also tend to promote a more productive range of thinking in students. By interacting with people other than the teacher, students have the opportunity to see ideas from many different perspectives and to gauge their own learning. Similar to portfolios, devices such as journals and videotapes can record the process of these important learning experiences as well as their results. When students have opportunities to review their learning, especially with peers, they develop a wider range of skills and begin assuming more responsibility in shaping their own educational experiences.

CONCLUSION

Theories that expand our notions of intelligence have offered some hope for understanding the successes and the failures of students like Sophia, Rui, and Lynn. Gardner's theory of multiple intelligences argues that these students may have great potential, both in school and adult life. Drawing on the basic notion that students bring multiple abilities with them to school, and that school can offer a much richer range of opportunities than is commonly emphasized, several ongoing efforts have shown how the perspective of Multiple Intelli-

gences theory can help more students capitalize on their skills. The ultimate goal of these efforts is to reach beyond the schools and into later life.

Even more than school success, performance in any vocation or avocation depends on a combination of intelligences. One has only to reflect on the disparate duties performed by teachers, lawyers, mechanics, artists, doctors, parents, engineers, and business people to see that much more than linguistic or logical-mathematical intelligence is needed for success in any of these occupations. If we declare our educational goal to be preparing children for productive adult lives, we have an obligation to help students develop all of their intelligences. By more closely mirroring the complexities of adult life, including its demand for multiple and intertwined skills, school can better prepare our youth to assume responsibility for our world—and, in the future, their world.

We would like to express our gratitude to the William T. Grant Foundation, the Lilly Endowment, the MacArthur Foundation, the James S. McDonnell Foundation, the Pew Charitable Trusts, the Rockefeller Brothers' Fund, the Rockefeller Foundation, and the Spencer Foundation for their generous support of the work described in this chapter. We would also like to thank the students, teachers, and administrators who have been invaluable sources of information and enthusiasm in our research.

REFERENCES

- Ceci, S. (1990). *On intelligence, more or less*. Englewood Cliffs, NJ: Prentice Hall.
- Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. New York: Harper & Row.
- Feldman, D. H. (1986). *Nature's gambit: Child prodigies and the development of human potential*. New York: Basic.
- Gardner, H. (1991a). *Intelligence in seven phases*. Paper presented at the 100th Anniversary of Education at Harvard, Cambridge, MA.
- Gardner, H. (1991b). *The unschooled mind: How children think and how schools should teach*. New York: Basic.
- Gardner, H. (1990a). Assessment in context: The alternative to standardized testing. In B. R. Gifford & M. C. O'Connor (Eds.), *Changing assessments: Alternative views of aptitude, achievement, and instruction* (pp. 77-119). Boston: Kluwer.
- Gardner, H. (1990b). *The assessment of student learning in the arts*. Paper presented at the Conference on Assessment in Arts Education, Bosschenhoofd, the Netherlands.

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- Gardner, H. (1983). *Frames of mind: The theory of multiple intelligences*. New York: Basic.
- Krechevsky, M., & Gardner, H. (1990a). Approaching school intelligently: An infusion approach. In D. Kuhn (Ed.), *Developmental perspectives on teaching and learning thinking skills* (pp. 79-94). Basel: Karger.
- Krechevsky, M., & Gardner, H. (1990b). The emergence and nurturance of multiple intelligences. In M. J. A. Howe (Ed.), *Encouraging the development of exceptional abilities and talents* (pp. 222-245). Leicester, England: British Psychological Society.
- Olson, L. (1988, January 27). Children "flourish" here. *Education Week*, pp. 1, 18-21.
- Sternberg, R. J. (1985). *Beyond I.Q.: A triarchic theory of human intelligence*. New York: Cambridge University.
- Walters, J., Blythe, T., & White, N. (in press). PIFS: Everyday cognition goes to school. In H. Reese & J. Puckett (Eds.), *Advances in lifespan development*. Hillsdale, NJ: Lawrence Erlbaum.
- Winner, E. (in press). Arts PROPEL: An introductory handbook. In E. Winner (Ed.), *Arts PROPEL Handbook Series* (vol. 1). Princeton, NJ: Educational Testing Service; Cambridge, MA: Harvard Project Zero.
- Wolf, D. P. (1988). Opening up assessment. *Educational Leadership*, 45(4), 24-29.

SEVEN WAYS OF KNOWING

David Lazear

In 1985, Howard Gardner published groundbreaking research on multiple intelligences in his book *Frames of Mind*. His findings point to a complex of seven intelligences, seven ways of knowing, perceiving, and understanding life. And Gardner believes there are probably other intelligences that we have not yet been able to test. Figure 1 gives an overview of seven ways of knowing we possess.

The good news is that each of us has all of these intelligences. However, since not all of them are developed equally, we do not always know how to use them effectively. Usually, one or two intelligences are stronger and more fully developed than the others. But this need not be a permanent condition. We have within ourselves the capacity to activate all of our intelligences, and as a consequence, amplified worlds of sensing, feeling, knowing, and being are opened to us!

In this chapter, I suggest a variety of practical classroom and school applications for the theory of multiple intelligences. There are at least three different ways multiple intelligences can be integrated into the curriculum.

Intelligence as a subject focus unto itself (teaching FOR multiple intelligences). Each of the intelligences can be taught as a subject in its own

right, such as teaching music skills; language; art as a formal discipline; mathematical calculation and reasoning; skillful body movement, as in physical education, dance, and drama; and various social skills necessary for effective functioning in our society. This approach involves teaching the accumulated wisdom of one's culture on the subject, the formal knowledge base, and the practical methods, skills, and techniques of the intelligence.

Intelligence as a means to acquire knowledge (teaching WITH multiple intelligences). Each of the intelligences can likewise be used as a means to gain knowledge in areas beyond itself. This could involve such things as using body movement to learn vocabulary words; music to teach math concepts; art (drawing, painting, and sculpture) to imagine different periods of history or different cultures; language to debate various perspectives on current events; and logical reasoning to compare and contrast characters in a Shakespeare play.

"Meta-intelligence"—intelligence investigating itself (teaching ABOUT multiple intelligences). Lessons that deal with meta-intelligence processes teach students about their own multiple intelligences—how to access them, how to strengthen them, and how to actively use them in learning and in everyday life. This is the metacognitive aspect of

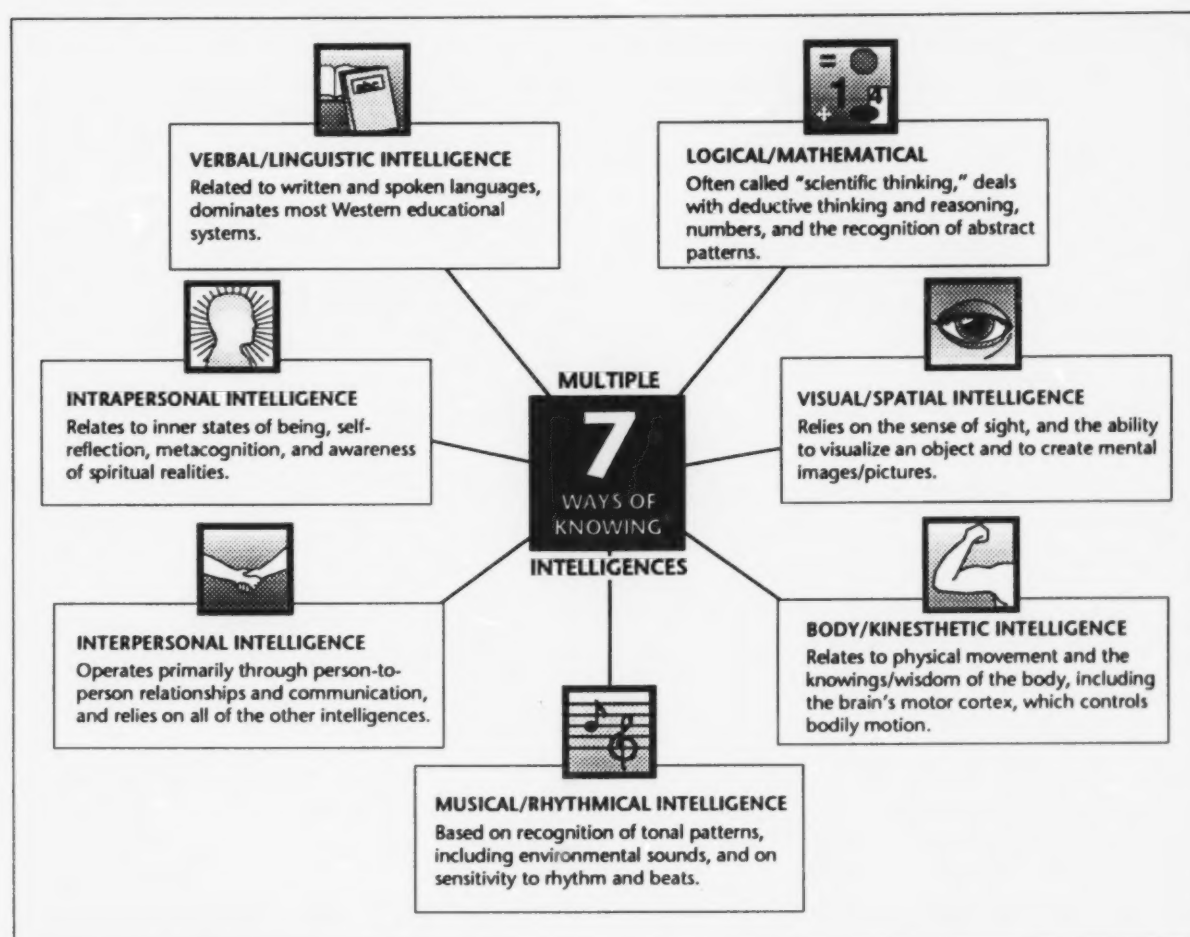


Figure 1 Seven Ways of Knowing, Not Just One!

using multiple intelligences in the classroom. The more students know about their different ways of knowing, the more skillful they can become in using them, both in the school situation and in their lives beyond the classroom.

SKILLS STUDENTS NEED TO ACCESS THEIR FULL INTELLECTUAL POTENTIAL (Teaching FOR Multiple Intelligences)

In my first book, *Seven Ways of Knowing*, I suggested a categorizing of different human capacities/potentials related to the seven intelligences. These have at times been called "sub-intelligences" by Gardner. A summary of these intelligence skills can be seen on the wheel in Figure 2.

It is also important to note that at different ages we have different capacities. This is crucial for designing curricula that teach students the full spectrum of intelligence skills in ways and at times appropriate to particular developmental stages of their growth as human beings.

The chart in Figure 3 represents an initial effort to list various skills for each of the intelligences that need to be taught and used by students at different stages of their developmental journey.

The first stage I have called **Basic Skill Development**. This development generally takes place during the early years of life and involves the "raw patterning" of the intelligence. This stage gives one the necessary building blocks of intelligence—those basic tools one will need later for more complex intellectual pro-

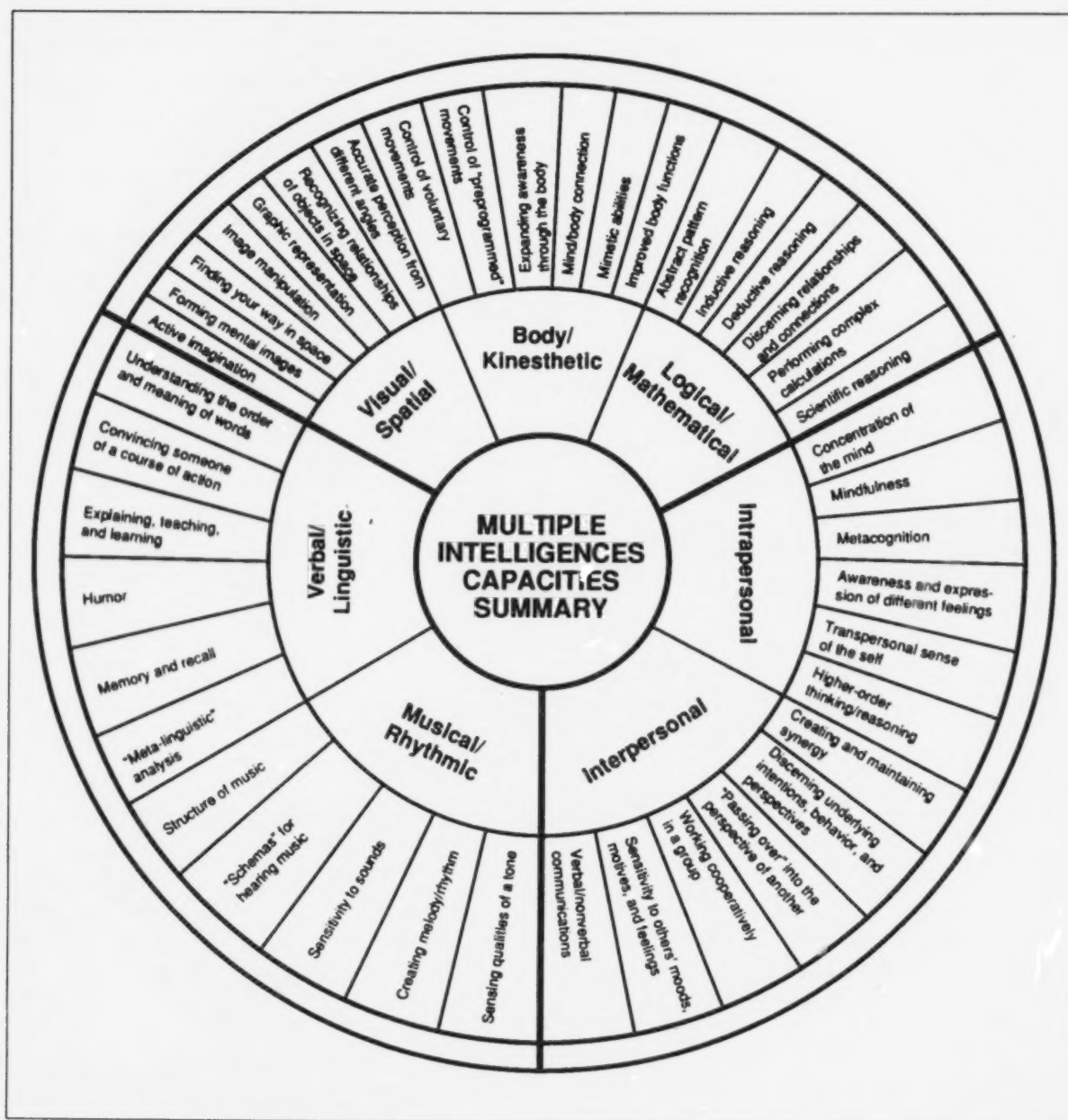


Figure 2 Multiple Intelligences Summary Wheel

cesses and operations. The acquisition of the skills appropriate to this stage is more or less "guaranteed" for most individuals, both by our neurobiological make-up and by the socialization processes of our culture. However, what happens to one's intellectual skill development beyond the early years is highly contingent on one's family, school, and social environment.

The second stage is **Complex Skill Development**. This stage involves several important elements, including an expansion of all intelligence skills—building on those basic patterns acquired during the first stage—based on instruction and experience in their effective use in problem-solving tasks. This is likewise the stage in which one begins to learn the

	VERBAL/LINGUISTIC 	LOGICAL/MATHEMATICAL 	VISUAL/SPATIAL 
Basic Skill Development ("raw patterning" of intelligences) infancy/ pre-school levels	• infant babbling • single words • pairs of words/meaningful phrases • simple sentences (poor syntax) • imitation writing (letters/name)	• object manipulation • counting • number recognition • simple abstraction • pattern recognition • cause/effect thought patterns	• sensori-motor exploration of the world • color discernment • shape discernment • drawing (simple) • getting from one place to another
Complex Skill Development (intelligences symbol systems) elementary/ middle school levels	• complex sentences (good syntax) • grasp of grammar • reading (stories & other narratives) • humor (telling & understanding jokes) • expanding vocabulary • self-initiated writing	• understanding math processes • performing standard math operations (+, -, x, ÷) • problem-solving skills • thinking-patterns development • complex abstraction (math symbols)	• recognition of spatial depth & dimension • drawing, sculpting, painting (reproducing objects/scenes) • map reading • active imagination • decentration (seeing from different perspectives)
Higher-Order Intelligence (synthesis and integration) secondary school levels	• creative/expressive writing • story telling/inventing • poetry creation/appreciation • debate/formal speaking • figures of speech • meta-linguistic conversation	• linking operations for complex problem solving • finding unknown quantities (algebra) • metacognitive processing • logic/math proofs • inductive/deductive reasoning processes	• building (blueprints) • map making • impressionistic/expressionistic art form creation • abstract spatial imagery (e.g., geometry) • complex visual/spatial relationships (e.g., chess)
Vocational Pursuits (societal service/career paths) college/ adulthood levels	• public speaking • writing (novelist, poet, journalist) • comedian • playwriting • newscasting • storytelling/writing	• scientific exploration • accounting/business • legal assistance • banking • computer programming • mathematician • medicine	• architecture • graphic design artistry • cartographer • drafting • painting (art) • sculpting • advertising

Figure 3 Growth and Development of the Seven Intelligences

BODY/KINESTHETIC 	MUSICAL/RHYTHMIC 	INTERPERSONAL 	INTRAPERSONAL 
• automatic reflexes • basic motor skills (crawling, standing, walking, sitting) • gaining physical independence • actions to control environment • goal-oriented actions	• the basic "Ur" song (universal song of babies) • tonal recognition • tonal reproduction • rhythm recognition • rhythm reproduction • sound association forming	• parental bonding • recognition/acceptance of familiar others • simple communication with others • imitation of sounds, words, and facial expressions	• expression of a range of body states • awareness/expression of personal feelings • correlation of certain emotions with specific experiences • awareness of separate self-identity
• folk/cultural dance • expressive gestures/body language • gymnastics • role playing/charades • physical skills (e.g., typing, roller skating, riding a bike) • sports games	• melody/song production • reading music • production of varying rhythm/beats • music/rhythm technique development • enjoyment of certain music types	• establishment of peer relationships (beyond family) • development of social skills • empathy for others • being part of a team • social role playing	• concentration skills • "why" questioning (trying to make sense) • self-improvement skills attainment • defining personal likes/dislikes • correlation of others' behavior with self
• inventing • creative/expressive dance (e.g., ballet) • dramatic enactment of complex scenes • complex physical exercise routines • sports (skilled execution)	• music composition • music performance • teaching music to others • understanding music theory • grasping the meaning of music symbols • music appreciation skills	• consensus building • understanding group processes • cooperative problem solving • recognition of cultural values and norms • recognition of various "social ideals"	• symbol creation/understanding • conscious control of emotional states • identity search • personal beliefs/philosophy • conscious use of higher-order thinking
• dramatic acting • athletics • professional dancing • inventing • mime • physical education instruction	• advertising • performance musician • composing music • music teaching • environmental sound engineering • film making • musical theatre • television	• counseling • professional teaching • politics • religious leader • therapist • sociologist • anthropologist	• philosopher • psychiatry • spiritual counseling • guru • cognitive patterns research • human potential exploration

Figure 3 (continued)

"language" and "symbol system" for each intelligence. For example, the language of musical/rhythmic intelligence includes tone frequencies, sound, rhythm, beat, and vibrational patterns, whereas its symbol system involves such things as notes on a musical staff, and various other markings and symbols that tell one how the notes are to be played. If one does not learn both the language and symbol system of the musical/rhythmic way of knowing at this stage, further development of the intelligence is thwarted. The same is true for each of the other intelligences.

The third stage I have called **Higher-Order Intelligence** (as in higher-order thinking). This involves a process of synthesizing information gained and skills learned in the previous stages, as well as learning how to integrate the intelligences into one's regular "repertoire of living." This stage involves learning how to skillfully use the different intelligences and to interpret or process the kinds of information one receives through the different ways of knowing.

The final stage is **Vocational Pursuits**. Generally, people will choose their career path(s) based on those intelligences that they best understand and with which they are most comfortable. If one has, however, learned how to use and appreciate the full spectrum of one's intellectual capacities, there will be increased work satisfaction, effectiveness, and creativity due to the ability to process information and engage in problem solving on many more levels simultaneously.

The divisions between these stages are not fixed, and there may be some overlap between aspects. However, this does give us a picture of how the intelligences develop, and how we can help students gain a full spectrum of knowing tools to amplify and enrich their education and their future lives.

One implication of this developmental approach to human intelligence is that we must take a new look at the curriculum we are teaching to make sure that students learn how to use each of the intelligences both in the classroom and in their lives beyond the school setting.

A New Look at the Curriculum: Taking the "Extra" out of "Extra-Curricular"

As I mentioned above, beyond the Basic Skill Development stage, intelligence development is greatly

influenced by one's family and social environment. If we want our students to be more intelligent in more ways and at more levels, we must consciously and explicitly teach them! What this means is that the fine arts and so-called "extra-curricular" parts of the school curriculum should be the last to be cut when our schools are facing financial difficulties. It is often these "extra" parts of the curriculum that teach students to understand and use the full spectrum of their intelligence capacities. In light of current research on integrating the curriculum, we must find and teach the "fine arts" components that are present in every subject area. Following are four scenarios that illustrate what an integrated fine arts curriculum might look like.

SCENARIO 1: In history, students can learn the art, music, and dance of a particular period by performing them. They can study and enact the dramas that were popular or write their own in the style of the period using modern-day themes. They can read the great stories of the period. They can study science and perform the experiments that led to certain scientific discoveries and breakthroughs.

SCENARIO 2: In language arts, there are countless opportunities to teach the "fine arts," and thus, help students gain basic intelligence skills. In literature lessons, students can draw pictures or act out what they are reading. They can "role play" grammar or write a drama in which the characters are the parts of speech. In this way, students can be taught how to use the active imagination to fully appreciate and understand great literature.

SCENARIO 3: In math, students can learn math facts and concepts using manipulatives (e.g., sculpting with clay). They can write stories using verse and rhyme; study the mathematical patterns and concepts that are embedded in music and dance; and learn geometric formulas through role playing. The teacher may design "inventing projects" that require students to use a wide variety of math concepts and operations.

SCENARIO 4: In science, students can learn to draw accurately what they see under a microscope. Students can perform lab experiments in cooperative

groups and keep a log of their findings. They can be encouraged to track and improve various thinking patterns, such as prediction, causal reasoning, comparisons and contrasts; or to study the science of sound and music and its effect on the body.

LESSONS THAT TAKE INTO ACCOUNT MULTIPLE INTELLIGENCES (Teaching WITH Multiple Intelligences)

There are three major presuppositions behind my thinking on teaching WITH multiple intelligences: (1) we can teach *all* students to be more intelligent in many more ways, and on more levels of their being than they (or we) ever dreamed of; (2) *anything* can (and should) be taught and learned through all of the intelligences; and (3) we as educators have some very important homework to do in order to learn how to use multiple intelligences in the teaching/learning process.

Generally speaking, there are four stages necessary to teach WITH multiple intelligences. The developmental sequence is something like the following:

Stage I: Awakening the Intelligences

We must first be aware that we do in fact possess multiple ways of knowing and learning, and we must learn various techniques and methods for "triggering" an intelligence within the brain/mind/body system. Each of the intelligences is anchored in the five senses so a particular intelligence can be activated through exercises and activities that use the sensory bases (sight, sound, taste, touch, smell, speech, and communication with others) as well as the "inner senses," such as intuition, metacognition, and spiritual insight.

Stage II: Amplifying the Intelligences

Second, we must learn how particular intelligences function. We must find out what capacities and/or skills are associated with them. We must find out how to access them, and how to use and understand different intelligence modalities. This involves practice in strengthening intelligence capacities as well as learning how to interpret and work with the different kinds of information we re-

ceive through each intelligence. We must learn to understand the unique language of each intelligence, that is, how each expresses itself. The language of body/kinesthetic intelligence, for example, is physical movement—not words, sentences, writing, or speech.

Stage III: Teaching With the Intelligences

We must learn how to teach content-based lessons that apply different ways of knowing to the specific content of a given lesson. This involves learning how to use and trust a given intelligence in knowing, learning, and understanding tasks. Teaching WITH intelligences is approached from the perspective of classroom lessons that emphasize and use the different intelligences in the teaching/learning process. Approximately ninety-five percent of the material we have to teach comes prepackaged in a verbal/linguistic or a logical/mathematical form. However, it is important to understand that in planning lessons to teach this material, we need not be bound by the packaging. We must learn how to design and implement lessons that emphasize all seven ways of knowing. In presenting lessons this way, we will reach more students more of the time.

Stage IV: Transferring the Intelligences

Finally, we must learn, and we must teach our students how to use, all of the intelligences to improve students' effectiveness in dealing with the issues, challenges, and problems they face in the task of daily living. This task is primarily a matter of approaching all problems on multiple levels, using a variety of problem-solving methods that tap the full spectrum of intelligences. The goal of this stage is to make multiple intelligences a regular part of one's cognitive, affective, and sensory responses to all of life's challenges. For a sample model lesson see Figure 4.

HOW STUDENTS BECOME AWARE OF THEIR OWN "SEVEN WAYS OF KNOWING" (Teaching ABOUT Multiple Intelligences)

As far as we know, human beings are the only creatures who are self-reflective; that is, who have the

PARTS OF SPEECH MODEL LESSON

1. *Discuss and understand the definition of your part of speech.*
 - Divide the class into eight teams with three to four students per team.
 - Give each team a card with the definition of one part of speech written on it (noun, pronoun, adjective, verb, adverb, preposition, conjunction, interjection).
 - Teams are to read and make sure that each member understands the definition.

(NOTE: Be sure you check in with the teams to make sure they are clear on their assigned part of speech.)
2. *Write a song to teach your part of speech using a common tune.*
 - Decide on a common tune each team will use for their song (e.g., "Are You Sleeping, Brother John?")
 - Each team creates a song that communicates the definition of its assigned part of speech.
3. *Make up a physical gesture or body movement for your part of speech.*
 - Each team brainstorms a list of actions that "em-body" the definition of their assigned part of speech (something it might do or an action it might perform if it could).
 - Teams decide on one (or a combination) of the actions/gestures on their list to teach their part of speech to the rest of the class.
4. *Create a flag and slogan for your part of speech.*
 - Pass out a large piece of paper and colored markers to each team.
 - Teams think of a symbol/picture/emblem for their assigned part of speech (something it might draw if it could).
 - Each team is to create a slogan to go with their symbol/picture/emblem and to write it on the flag.
5. *List examples of your part of speech.*
 - Each team lists six to ten words that are examples of their assigned part of speech.

(NOTE: The conjunction and interjection teams may need some special help from you to come up with six to ten examples.)

 - List the example words on the same piece of paper as the flag and the slogan.
6. *Present the team's report.*
 - Have each team present its definition, flag, slogan, song, gesture/physical movement, and list of examples to the class.
 - Check in with the class for understanding and/or questions.
7. *Combine words from each group to make sentences.*
 - In some random fashion, have each team select two words from each list of examples.
 - The sixteen words chosen are part of a pool from which each team is to make three separate sentences.

(NOTE: Each of the sentences does not have to contain all of the words chosen, but each of the words must be used at least once in the three sentences. The sentences will most likely be somewhat bizarre! They may add articles as needed.)
8. *Reflect on the lesson.*
 - Have each group share one of its sentences with the rest of the class.
 - Discuss the lesson:
 - What struck you about this lesson? What did you notice?
 - What feelings did you have as you went through the various stages? What was fun? Surprising? Difficult?
 - What did you like about approaching the lesson in all these different ways? What did you dislike about it?
 - How did this way of learning about the parts of speech help you?
 - What did you learn about the parts of speech from the lesson?

Figure 4 Model Lesson

ability to step back and watch themselves, almost like an outside observer. Once we become aware of something in our lives, our self-consciousness gives us the power to change it if we so desire. This self-reflective dimension is at the heart of helping students understand their own multiple intelligences, how to improve them, and how to consciously use them to enhance their own and others' lives.

There are basically four levels of meta-intelligence lessons—lessons that can help students become aware of the seven ways of knowing and how to use them more effectively. These levels are modeled after research into the dynamic levels of metacognition.

TACIT ("I use the seven intelligences every day, I've just never called them that!"). The tacit level of learning about the intelligences involves exercises

and activities that help students become aware of capacities and potentials that are part of their heritage as human beings. These are the generally taken-for-granted "intelligent" things we do in the normal course of living, such as parallel parking a car, listening to music while we work or exercise, using gestures and other body movement to express our ideas and feelings to others, telling jokes, and balancing a checkbook. Once a person is aware of the seven intelligences and how much they are a part of normal daily living, the possibility for improving them is established.

AWARE ("Now that I have a label for the different ways of knowing, I am more conscious of when and how I use them!") The aware level of learning about multiple intelligences involves exercises and practices for learning more about how the intelligences operate and how their functioning can be improved. In some ways, the use of the intelligences is like any skill we possess; the more we practice it, the greater our mastery of it. One of the tasks of lessons dealing with the aware use of the intelligences is to help students become conscious of their own intelligence strengths and weaknesses, understanding that weakness need not be a permanent condition. If a student discovers, for example, that she is not very good at using active imagination (a visual/spatial intelligence capacity), she may be made aware at the same time that this capacity is inherent in the brain and can thus be developed. The same is true for the capacities related to each of the other intelligences.

STRATEGIC ("Not only do I know about the seven intelligences, but I know when and how to use each one most effectively!") The strategic level of learning about the seven ways of knowing involves skill in the two previous levels of meta-intelligence I have outlined, plus a conscious decision to employ the different ways of knowing on a regular basis to enhance learning, expand creativity, and improve problem solving, both in one's self and others. In other words, the strategic use of the intelligences is a matter of using them with intention. For example, the student who suggests to his teacher particular intelligence strategies that could be used in a lesson to help students "get it" more quickly and thoroughly uses strategic metacog-

nition. A case in which a student assists another student with schoolwork by helping translate a lesson into a preferred or stronger intelligence modality may serve as another example.

REFLECTIVE ("I am learning how to use the seven intelligences to help me in my daily life!"). The reflective level of learning about the intelligences involves activities that help students integrate the seven ways of knowing into their "repertoire for living." They begin to understand that any problem or challenge can be approached through the seven intelligences, and that greater levels of creativity are available to them as a consequence. Likewise, with various learning tasks, the seven intelligences not only make learning more fun, but they also broaden one's knowledge base, for now it is known and understood in at least seven ways, not just one!

Figure 5 is a beginning list of ideas for teaching students ABOUT multiple intelligences. Figure 6 is a brief explanation of each tool.

AUTHENTIC ASSESSMENT OF LEARNING: TOWARD "MULTI-MODAL" GRADING AND TESTING

The idea of teaching FOR, WITH, and ABOUT multiple intelligences instantly raises concerns about grading, testing, and assessing students' academic progress and achievement. This is difficult given the verbal/linguistic and logical/mathematical bias of our current educational systems. Paper-and-pencil testing is fine as long as we recognize its limits, and if we understand the nature of the information about student achievement it provides us. However, we often try to make these kinds of test scores into an ultimate indicator of what students have or have not learned.

How do we assess students' intelligence capacities? We must first understand the relative strengths and weaknesses of students in the seven intelligence areas. This is important in light of the fact that current research indicates that intelligence is not as fixed or as static a phenomenon as we once thought (Gardner, 1985; Feuerstein, 1980; Houston, 1980, 1982; Harman & Rheingold, 1985; Machado, 1980; Sternberg, 1984; Guilford, 1979; Dickinson, 1987). In fact, intelligence appears to

TEACHING ABOUT MULTIPLE INTELLIGENCES: "META-INTELLIGENCE" LESSON IDEAS

- I. TACIT: Tools for exploring intelligence capacities and potentials used daily but with little awareness or thought.
 - People Search
 - Self Report Card
 - "Wraparound" Processing
 - Recognizing Others' Capacities
 - Self Behavior Checklist
- II. AWARE: Tools for creating awareness of how the intelligences work and for discovering one's own strengths and weaknesses.
 - Multiple Intelligence Activity Posters
 - Exploring Intelligence Capacities with a Partner
 - Self-Evaluation Techniques
 - Intelligence Games and Problem-Solving Activities
 - Intelligences "Think-Pair-Share"
- III. STRATEGIC: Tools for using the intelligences to enhance learning, expand creativity, and improve problem solving.
 - Multiple Intelligences Coaching Teams/Activities
 - Multiple Intelligence Roles in Cooperative Groups
 - Multiple Intelligence Use and Improvement Planning Charts
 - Individual Intelligence Access Tracking (effective "trigger" techniques)
 - Kitbag of Favorite Intelligence Tools (paints, music, symbols, etc.)
- IV. REFLECTIVE: Tools for reflecting on how to use the intelligences and for integrating them into one's "repertoire for living."
 - "7-in-1" Activities (all seven intelligences involved in a task)
 - "Each One Teach One" (an intelligence skill/capacity)
 - Intelligence Capacities Analysis with Graphic Organizers
 - Venn Diagram (compare and contrast)
 - Web (attributes)
 - Matrix (classification by different characteristics)
 - T-Chart (looks like, sounds like, feels like)
 - Reflective Journals and Logs
 - Daily Intelligence Focus

Figure 5 "Meta-intelligence" Lesson Ideas

be a dynamic, continually evolving process that changes throughout one's life. Thus, intelligence assessment and evaluation should change with an individual's age as well.

In *Seven Ways of Knowing* I suggest five techniques for beginning to get a picture or profile of students' intelligence strengths and weaknesses. This information is important from at least two perspectives: (1) helping students develop a fuller spectrum of intellectual abilities for use in the classroom and, hopefully, in their lives beyond the classroom; and, (2) finding new strategies for utilizing students' stronger intelligences to help more students succeed in school. These intelligence assessment techniques are built on the presupposition that we as educators need to develop new skills of carefully observing students involved in the learning process. We can learn an immense amount about our students if we watch them more carefully, using the seven intelligences as a

guideline! A summary of the techniques presented in *Seven Ways of Knowing* follows.

Multiple Intelligences Assessment I: Toward Evaluation of Intelligence Profiles

Student Intelligence Watch Create a list of behaviors to watch for, which may give you clues as to how a student processes information in a lesson. For example, watch for the "doodler," the one who can't sit still, the incessant questioner, the peer relations fanatic, the silent/reflective one, etc. Keep an observation checklist in which you consciously log students' behavior patterns during knowing/learning tasks over a two-week period. Write down your reflections on what you learn about their ways of knowing.

Intelligence Skill Games Watch students while involving them in a series of skill games. Let them choose which game(s) to play and then carefully

META-INTELLIGENCE TOOLS EXPLANATION

1. **PEOPLE SEARCH:** Create a list of questions about different skills and abilities related to the seven intelligences. Have students interview each other to find those who are good at performing the various skills.

2. **SELF REPORT CARD:** Give students large index cards and have them write information about themselves on the card related to the seven intelligences. For example, have them note a physical feat they can perform, draw a symbol of how they feel today, or note a favorite song. Have them share and discuss their report cards with two other students, noting similarities and differences.

3. **"WRAPAROUND" PROCESSING:** At the end of a lesson or activity have each student draw a visual symbol that represents how they feel about the lesson or activity. Each student then shows the symbol to the rest of the class but may not talk about it. Other variations include making a physical gesture or movement, making a sound, humming a few bars from a song, and writing a short poem.

4. **RECOGNIZING OTHERS' CAPACITIES:** Have students create a checklist of things to watch for in others that indicate they are using their seven intelligences, such as drawing, creative writing, using physical skills on the playground, or displaying social skills or problem-solving skills. Have students observe each other for one week, noting their differences and similarities.

5. **SELF BEHAVIOR CHECKLIST:** Start students on an intelligence tracking log or diary. Have them stop and analyze their behavior three times during the day using the seven intelligences as a guideline. List specific things they did with different intelligence capacities, for example, counting your change at the store, or giving or following instructions to go someplace.

6. **MULTIPLE INTELLIGENCE ACTIVITY POSTERS:** Design a poster (or workbook) that contains seven different activities for students to perform, each activity utilizing one of the intelligences. Writing humorous limericks on serious topics, creating a number pattern to stump someone else, and drawing a picture that symbolizes a goal are possible activities.

7. **EXPLORING INTELLIGENCE CAPACITIES WITH A PARTNER:** Make up a set of cards with different intelligence tasks written on each card—for example, make up a dance about the changing seasons, paint a mural about life in the year 2090, or create a rap song about an issue in your school or community. Pairs of students get a stack of cards and together perform the assigned tasks. Make sure the partners discuss their feelings about, and comfort level with, the different tasks.

8. **SELF-EVALUATION TECHNIQUES:** Design a variety of ways for students to evaluate their performance in using the seven intelligences. For example, have them rank themselves on a scale of one to ten on their comfort level with a particular intelligence, rank the intelligences by their own preferred modality, or do a "PMI" analysis of each intelligence (P=pluses for me, M=minuses for me, I=interesting to me).

9. **INTELLIGENCE GAMES AND PROBLEM-SOLVING ACTIVITIES:** Provide students with games to play that are related to the intelligences, such as "Scrabble," "Pictionary," "Twister,"

"Checkers," or "Name That Tune." Or, give them a problem to work on and ask them to find seven different ways to solve it.

10. **INTELLIGENCES "THINK-PAIR-SHARE":** Have students work in pairs and tell each other about times they used each of the seven intelligences. One speaks and the other listens. Each pair then joins another pair. Each set of partners now tells the others about its experiences with the seven intelligences.

11. **MULTIPLE INTELLIGENCES COACHING TEAMS:** Group students to ensure heterogeneity in terms of different intelligence strengths. Create a series of activities that can potentially engage the full spectrum of intelligence capacities. For example, their task in the teams is to help all members of the team learn how to complete the activity and to practice approaching a given activity using several different intelligences.

12. **MULTIPLE INTELLIGENCE ROLES IN COOPERATIVE GROUPS:** When using cooperative techniques to enhance classroom learning, assign roles to students that are related to the intelligences. For example, assign a visual recorder (engages team in the creation of pictures to go along with the written record), a thinking tracker (keeps record of the logical thought processes the teams uses), or an inter/intra-encourager (ensures the support, identity, and trust of the team and makes sure that the feelings of individual members are honored).

13. **MULTIPLE INTELLIGENCE USE AND IMPROVEMENT PLANNING CHARTS:** For each intelligence create two lists: 1) When do I most like to and when do I most need to use this intelligence? and 2) What are things I can do to improve or strengthen this intelligence in my life?

14. **INDIVIDUAL INTELLIGENCE ACCESS TRACKING:** Have students brainstorm all of the different types of "triggers" they can think of for the different intelligences. Then have each individual rank the team's list from "the one that works best for me" to "the one that may work for others but does nothing for me."

15. **KITBAG OF FAVORITE INTELLIGENCE TOOLS:** Give each student a cigar box with the assignment that they are to put into the box something that represents one favorite tool or strategy for each intelligence, for example, a set of water colors, a favorite piece of poetry, or an audio-cassette tape of music. Encourage students to include things that remind them of the seven ways of knowing and how they can use them every day.

16. **"7-IN-1" ACTIVITIES:** Any activity can be approached in multiple ways. Have students figure out how to accomplish otherwise-taken-for-granted tasks on at least seven different levels, for example, the process of going to the lunch room, straightening up the classroom at the end of the day, or organizing the class for a game during recess.

17. **"EACH ONE TEACH ONE":** Have all students rank themselves for strongest intelligence and weakest intelligence. Pair students, matching a strength with a weakness. Have the stronger students work with the weaker to improve their skill with the intelligence in question; for example, teaching the other how to "see with the mind's eye," how to tell directions outside, or how to play a simple tune on a piano.

Figure 6 Meta-Intelligence Tools Explanation

META-INTELLIGENCE TOOLS EXPLANATION (continued)

18. INTELLIGENCE CAPACITIES ANALYSIS WITH GRAPHIC ORGANIZERS:

Venn diagram—List unique characteristics of an intelligence in each circle and the common characteristics in the overlap of the circles. Try working with a seven-way Venn eventually.

Web—List as many defining attributes of a given intelligence as you can think of on the rays of the web. Star the critical attributes, that is, the ones that are unique to the given intelligence.

Matrix—Make a chart that has seven columns across the top (one for each intelligence) and several rows down the side for such categories as "senses involved," "when most often used," "practice ideas," and "career examples." Have students fill in the chart with what they know about each of the intelligences according to the side categories.

T-Chart—Make three columns and label the first "looks like," the second "sounds like," and the third "feels like." Analyze each intelligence by listing appropriate information in the columns.

19. **REFLECTIVE JOURNALS AND LOGS:** Have students do a daily journal/log entry related to the seven intelligences using such lead-ins as: "The intelligence that I used most today was __," "I had most trouble using __ intelligence today because __," or "A key insight I had about my intelligences today is..."

20. **DAILY INTELLIGENCE FOCUS:** At the beginning of a week, name each day of the week as an intelligence emphasis day. During the day do everything you can to use and learn about the intelligence focus for the day. For example, try an innovative approach to a mundane task using an intelligence not usually involved, or try expressing your thoughts and opinions in unique ways that take you beyond talking, writing, and logic.

Figure 6 (continued)

watch what they do as they are playing the game. Suggested games include "Pictionary" (visual/spatial), "Charades" (body/kinesthetic), and crossword puzzles or word jumbles (verbal/linguistic). Have at least one game per intelligence. Remember, how students play a game may be as instructive as which game(s) they choose. Do this a number of times and keep a log of your observations.

Intelligence Attention Foci Show students a film or a play in which the intelligences are dramatically portrayed; for example, one that involves great music, person-to-person relationships, lots of physical action or physical skills, clever problem solving, vibrant colors, symbolism, or great dialogue. Afterwards, lead a discussion on the performance, listening carefully to what students focused their attention on, what "captured their imagination," and what they liked or disliked. See if you can catch a glimpse of different intelligences in students as they watch the same movie or play.

Complex Problem Solving Expose students to a problem situation complex enough to stimulate several intelligences in the effort to find a solution. Make sure students know they can do anything they

want to reach a solution, such as drawing, talking to each other, or getting out of their seats. Remember, from the perspective of building an intelligence profile of your students, how they approach the problem is far more important than whether they get the "right" answer. So watch carefully what they do as they work.

Inventing Provide students with an opportunity to design or create something. Around the room set up different kinds of "laboratories," each having the tools and materials of a different intelligence. For example, set paints, clays, colored marking pens at one station; drums, rattles, a guitar, and harmonica at another station; and so on. Give students time to create whatever and however they want. Watch them carefully as they work, noting both the "lab" to which they were naturally drawn and what they do once they are involved in the act of creation.

Multiple Intelligences Assessment II: Toward Evaluation of Academic Progress

Student Portfolios Have students create a portfolio that contains a selection of things they have produced during a term. These should be items

that demonstrate progress toward their goals. Let them decide what to put in their portfolios, but encourage them to include items that give evidence of how their thinking has changed during the term, show an improvement of skills, demonstrate increased self-reflection or growth in self-knowledge, and show examples of their "best work."

Student Journals/Logs Provide students with a special notebook. At the end of a lesson or unit, give students time to write, draw, or paint their own thoughts and reflections. For example, have them think about what they have been studying and then have them write about its meaning for them today. Ask them to reflect on how they can use it beyond the classroom situation. Have them do an entry before and after the lesson to express their moods and feelings. Ask them to write about how their studies have been important in the past and how they will be important in the future.

"Multi-modal" Testing Instruments Experiment with nontraditional ways—ways which go beyond verbal/linguistic and logical/mathematical ways of knowing—for students to demonstrate their knowledge of a topic. For example, a test involving bodily/kinesthetic knowing could be couched in terms of body movement itself, including gestures, physical action, role play, dance, or inventing. A test using visual/spatial knowing could

involve drawing, painting, active imagination, and sculpting as the primary means by which students demonstrate what they have learned.

Intelligence Transfer Strategies Create strategies to help students gain the knowledge of a lesson using many different ways of knowing. Use their stronger intelligences to train the weaker ones. For example, a child who is not strong in grasping math concepts may understand if they are put to music or rap, or one who is weak in language arts skills may be helped if invited to act things out or to draw them. Next, create strategies to help students translate their knowledge into the intelligence forms most valued by our culture, namely verbal/linguistic and logical/mathematical.

Metacognitive Evaluation of Strategies Provide occasions for students to explore their own multiple intelligences. Lead them in exercises in which they learn how to activate or "trigger" each intelligence. Teach them practices for strengthening and improving their weaker intelligences. Give them opportunities to use the intelligences in daily classroom work. Help them discover ways to use the intelligences in their everyday lives beyond the classroom. In short, do anything that will help them develop their full intellectual potential and to be intelligent in as many ways as possible!

CREATING THE THOUGHTFUL CLASSROOM

	HISTORY	LANGUAGE ARTS	SCIENCE
VERBAL/LINGUISTIC 	Debate key controversial historical decisions for today	Write a modern-day sequel to a classical piece of literature	Verbally tell how to perform an experiment so that others can do it
LOGICAL/MATHEMATICAL 	Trace the patterns of historical development in the West	Predict what will happen next in a story	Apply the accepted steps of the scientific method
VISUAL/SPATIAL 	Create murals that tell the story of an historical period	Illustrate a piece of literature with color, images, and patterns	Draw patterns/images to illustrate different natural processes
BODY/KINESTHETIC 	Act out great moments from the past in a modern context	Play "Guess what author/ piece of literature I am?" (charades)	Act out scientific processes, such as planetary rotation
MUSICAL/RHYTHMIC 	Learn about various periods of history by analyzing their music	Illustrate a piece of literature with music, sound, and rhythm	Make a music tape to accompany different scientific processes
INTERPERSONAL 	Learn about part of a period and teach it to team members	Practice joint storytelling or writing with a partner	Assign teams to do lab experiments and to report them to the class
INTRAPERSONAL 	Imagine having dialogues from the past	Write a reflection on what you learn from literature that applies to life today	Keep a diary on discoveries about the self in science

Figure 7 Multiple Intelligences Lesson Ideas Matrix

GLOBAL STUDIES	MATHEMATICS	PRACTICAL ARTS	FINE ARTS
Conduct a nations-of-the-world "spelling and finding bee"	Write story problems in teams for other teams to solve	Explain to others how to make something while they follow	Write descriptions of famous art, music, and drama
Analyze a culture's development deductively and inductively	Work with manipulatives to learn math operations	Follow a recipe to make baked goods from scratch	Do scene/character analyses of a play using graphic organizers
Study other cultures through their painting and sculpture	Play "Math Jeopardy"—find the operations for answers	Create posters that show steps of an exercise routine	Have imaginary conversations with classical pieces of art
Learn to play games that are popular in different cultures	Physically embody geometry formulas/fractions of a whole	Teach and play a series of noncompetitive games	Create "living paintings/sculptures" of an idea or feeling
Learn about cultures through their music and rhythm	Write math operations, formulas, and problem-solving rap songs	Use music to improve computer keyboard skills	Learn math concepts embedded in musical/dance pieces
Conduct interviews with people from different cultures	Teach a partner to process and apply problems	Invent something new and teach others how to use it	Choreograph a dance about human relating and caring
Brainstorm gifts of different cultures for the individual self	Think/write about how math concepts help in daily living	Note your moods/feelings when working on a computer	Write a reflection on personal tastes in art, music, dance, drama

Figure 7 (continued)

REFERENCES

- Armstrong, T. (1987). *In their own way*. Los Angeles: J.P. Tarcher.
- Bellanca, J., & Fogarty, R. (1991). *Blueprints for thinking in the cooperative classroom*. Palatine, IL: Skylight Publishing.
- Buzan, T. (1977). *Using both sides of your brain*. New York: E.P. Dutton.
- Costa, A. (1991). *The school as a home for the mind*. Palatine, IL: Skylight Publishing.
- Costa, A. (Ed.). (1985). *Developing minds*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Dickinson, D. (1987). *New developments in cognitive research*. Seattle: New Horizons for Learning.
- Feuerstein, R. (1980). *Instrumental enrichment*. Baltimore: University Park Press.
- Fogarty, R., & Bellanca, J. (1989). *Patterns for thinking: Patterns for transfer*. Palatine, IL: Skylight Publishing.
- Gardner, H. (1985). *Frames of mind*. New York: Basic Books.
- Gardner, H., & Walters, J. M. (1985). The development and education of intelligences. In *Essays on the Intellect*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Guilford, J. P. (1979). *Way beyond I.Q.: A triarchic theory of human intelligence*. New York: Cambridge University Press.
- Harman, W., & Rheingold, H. (1985). *Higher creativity*. Los Angeles: J. P. Tarcher.
- Houston, J. (1982). *The possible human*. Los Angeles: J.P. Tarcher.
- Houston, J. (1980). *Life force*. New York: Dell.
- Lazear, D. (1991a). *Seven ways of knowing: Teaching for multiple intelligences*. Palatine, IL: Skylight Publishing.
- Lazear, D. (1991b). *Seven ways of teaching: The artistry of teaching with multiple intelligences*. Palatine, IL: Skylight Publishing.
- Machado, L. A. (1980). *The right to be intelligent*. New York: Pergamon.
- Sternberg, R. G. (1984). *Beyond I.Q.: A triarchic theory of human intelligence*. New York: Cambridge University Press.

THE MINDFUL MIDDLE SCHOOL: A SHIFTING PARADIGM

Elliot Y. Merenbloom

Unique opportunities exist in the middle school classroom for teaching thinking, a continuing educational goal. Thinking is a prerequisite for success in the learning process as well as in life itself. Opportunities to develop students' thinking emanate from the unique needs of middle school students, an approach to middle school curriculum based on these needs, and a team approach to the delivery of curriculum and instruction. Appropriate teaching strategies offer additional options to address the teaching of thinking in grades six, seven, and eight.

DEVELOPMENTAL NEEDS

First and foremost, the milieu of the middle school classroom should be based on an awareness of the physical, intellectual, social, emotional, and moral developmental needs of students in grades six, seven, and eight. Early adolescence is a period of extensive physical growth, with one blueprint for girls and a separate plan for boys. Puberty is the major physical event of this growth period. Girls enter puberty as early as eight and a half years of age, while boys tend to lag two years behind the girls. Students' individual differences and variations in growth patterns perplex

middle school educators. The middle school concept or notion of flexibility evolves from this developmental variance.

As a result of research on physical development, home-base or teacher/advisory programs have emerged in an effort to help students better understand and cope with these changes. To fulfill the guidance function of the middle school, teachers develop activities to explore such critical areas as decision making, resolving conflict, communication, understanding self and others, and study skills. As teachers plan for instruction, they should also recognize the short attention span, restlessness, and fatigue factors of their students. Adults must be sensitive to the feelings of students in the various stages of development and be careful not to reinforce feelings of inadequacy. Students also undergo a wide range of mental development between the ages of ten and fourteen. Piaget described a period of concrete operations (ages seven to eleven), followed by a period of formal operations (ages eleven to fifteen). In the period of formal operations, students begin to hypothesize; they utilize logic and reasoning in decision making. Yet, at this stage, they still have difficulty with concepts such as government and religion. Again, individual growth patterns exist.

The Shoreham-Wading River Middle School project (1987) in New York state describes teachers' efforts to become sensitive to the developmental levels of students and correlates these with requirements implicit in curricular tasks. As a result, teachers have made their lessons more concrete, have become more conscious of the move from the concrete to the abstract, and have witnessed enhanced learning.

All middle-level educators are keenly aware of the intensity of social-emotional development in the classroom and the corridors. Major topics in this area include group membership, self-concept enhancement, the need for catharsis, the ethnic identification process, sex role identification, peer approval, independence from adults, and the search for sophistication. Each of these is a major issue for the young adolescent. Thus, each has a great impact not only on the learning process, but also on all daily interactions.

Moral development is another area. School systems are becoming more aware of the importance of developing morals and values in the classroom and throughout the school community. In increasingly more cases, parents support the school's efforts. A common core of values suggests a guide to the creation of a moral education program. Such values include courtesy, critical inquiry, equality of opportunity, human worth and dignity, loyalty, knowledge, order, patriotism, responsibility, and tolerance.

The middle school structure offers a unique approach for teaching moral development, values education topics, and/or the common core of values. Topics can be introduced through the home-base or teacher/advisory program and then reinforced in the context of each subject area in the existing curriculum. As students realize the importance of these topics, they integrate or assimilate them more quickly.

Developmental needs of the early adolescent learner have implications for teaching thinking in the middle school classroom. Following are examples.

- Relate the content of the curriculum to the development of the students. Content in English, social studies, science, home economics, and music must connect to independence

from adults, the search for sophistication, group membership, and other social-emotional topics. In designing the motivational element of the lesson, teachers should use examples based on students' developmental needs. The home-base program also must relate directly to immediate, ongoing student development issues.

- Help students explore the world around them and the relationship between the pupil and the world. In social studies, for example, students must learn about various cultures in the world and the role of the early adolescent in each of these cultures. Through concrete examples, students must learn the meaning of the historical, governmental, economic, sociological, and geographical aspects of the world around them. Students must begin to see the relationship between these systems and career opportunities available to them.
- Be keenly aware of the individual timetables for growth. As in elementary education, teachers must see each student as an individual. Each student has a personal schedule for maturation. Instruction must be adjusted to this pace because all students may not necessarily be able to do the same assignment at the same time. Teachers must individualize their expectations of students to be realistic about each pupil's potential.
- Relate thinking processes and core thinking skills to the development of the individual. In concept formation, concrete examples play a major role. According to the mental development of individual students, there is a variance in the rate of moving from the concrete to the abstract, as well as in putting ceilings on the capacity for abstraction. In teaching analyzing skills, middle school teachers may have one expectation for grade six and another for grade eight. But, each middle school student is an individual, and instruction must be geared to that uniqueness.

The middle school classroom must be viewed as the link between elementary and high school from

both the developmental and instructional perspectives. In many ways, the middle school serves as a transitional experience further complicated by the fact that students grow at varying rates. The student leaves the self-contained elementary school environment and begins to mature. Even at the point of entering high school, differences are profound and obvious. Instructional strategies in the middle school must help the pupil evolve from a dependent, highly directed learner to a more independent, self-reliant, curious student in a variety of required and elected courses.

A MODEL FOR CURRICULUM

In response to these early adolescent needs, models of a middle school curriculum have emerged that focus on three major components—organized knowledge or factual information, skill development, and personal development.

Organized knowledge or factual information refers to all content or subject matter in all courses in the curriculum for grades six, seven, and eight. Typically, middle school students enroll in English, social studies, mathematics, science, reading, foreign language, art, music, physical education, home economics, technology education, and health. There must be a clear emphasis on factual information in each of these sequences. The middle-level learner is ready for the emphasis on concept formation, principle formation, gathering of information, and remembering.

Middle-level teachers also have an obligation to continue the emphasis on skill development that was paramount at the elementary school level. A focus on skills is necessary to continue and to expand the learning process. In addition to factual information, pupils must be taught how to learn. Typically, basic skill development includes reading, vocabulary development, comprehension, study skills, writing, computing, and listening. Core thinking skills include focusing, information gathering, remembering, organizing, analyzing, generating, integrating, and evaluating. These elements must be evident on a daily, hourly basis to enhance instruction.

Because of the significance of the changes in their physical, intellectual, social-emotional, and

moral development, middle school students need an opportunity to understand these changes—whether they have occurred or have yet to take place. More significantly, students need assistance in adjusting to those changes. Personal development topics typically include understanding one's self and others, group dynamics, decision making, resolving conflict, careers, and communication. These must be addressed on a daily basis through the home-base advisory program and then reinforced in the curriculum whenever possible.

There are two applications of this curriculum model. First, each subject must focus on organized knowledge or factual information, skill development, and personal development. Curriculum developed for English, social studies, music, or technology education must allow students to learn about content, skills, and personal development related to that segment of the course of study. A balanced curriculum for any subject in grades six, seven, and eight contains all three elements.

Secondly, the team approach to instruction is based on a fusion of organized knowledge, skills, and personal development. As an interdisciplinary team of English, social studies, mathematics, and science teachers work together, they find opportunities to integrate content, create a skill-of-the-week program, and correlate personal development topics.

This three-part model for middle school curriculum unifies the efforts of all teachers of all subjects of a grade level in the middle school. Thus, the students begin to see the interrelationship of all learning and the wholeness of curriculum. The early adolescent needs to see purpose and relationship on an ongoing basis. The team approach to content, skills, and personal development is far superior to the efforts of seven or eight teachers working in isolation.

The teaching of thinking is both manifested and reinforced by this curriculum model. Concept formation, for example, may well be a function of organized knowledge. But, it may also be viewed as an important skill for the early adolescent learner to master. Additionally, if the content relates to some aspect of early adolescent development, the personal development phase of the curriculum may be

involved as well. For example, at first, remembering may appear to be a skill. But, as the unit or lesson unfolds, remembering may also relate to content and personal development. What is the content to be remembered? Why is it important to remember this content? How does the act of remembering this content relate to the unique developmental needs of a middle school student?

The use of this curriculum model enhances the teaching of thinking. Students become more effective thinkers as well as more effective learners when teachers utilize this holistic approach to curriculum geared toward the early adolescent. Effective learning must be related to the developmental aspects of the student. Critical and creative thinking emerge as students see the interrelationship of content, skills, and personal development.

TEAM APPROACH TO INSTRUCTION

Obviously, the responsibility rests with teachers to deliver this unified approach to curriculum in general, and to the teaching of thinking in particular. Teachers must begin by addressing the role and function of a team. They must define the team and begin to examine their identity as a team. They need to explore their commitment to the middle school concept, how they will share their responsibilities, and how they will work to support each other. They must be aware of the limits of local autonomy as part of a team, school, and school district. To what extent will the team members use flexibility as they attempt to address student needs? To what extent will they have confidence in themselves and their colleagues to develop a meaningful program for their students?

Interdisciplinary teams involve two or more teachers working together to coordinate instruction in two or more subject areas. In most cases, interdisciplinary teams consist of an English, social studies, mathematics, and science teacher—ideally, all teachers of the grade level work together in an interdisciplinary fashion. In many cases, this approach is part of a restructuring or site-based leadership process.

Teachers must see the relationship between planning periods and the instructional program.

Almost all that happens in a team teaching situation results from plans developed during planning periods. In organizing middle schools, adequate time must be provided for teachers to brainstorm instructional concerns. Again, ideally, these team planning periods are in addition to personal planning periods for each teacher.

To enhance teacher awareness of the relationship between planning periods and the instructional program, teachers should

- examine their own curriculum guide to identify opportunities for correlation of content, skills, and personal development.
- share with teachers of other subjects those topics and skills that can be correlated to enhance the learning experiences of students.
- prepare a calendar so these unified learning experiences can be scheduled throughout the year.
- utilize team planning periods to arrange for field trips, films, and guest speakers.

A team planning log is suggested to help the team monitor the daily, weekly, and/or monthly operation. The log provides an opportunity to record specific correlations of content, skill-of-the-week emphases, personal development topics with reinforcement in all content areas, pupil adjustments, and efforts to accomplish team goals. The log ensures a balanced focus on the needs of students and the delivery of instruction, including the integrated effort on teaching thinking throughout all content areas. The team has numerous opportunities to orchestrate the focus on thinking skills. The log can be used to guarantee a variety of strategies to meet the needs of all students in an interesting, ongoing, and spiraling basis. Logs can also be used for planning in future years.

To truly ensure a balance between content and focus on children as well as a comprehensive effort to teach core thinking skills and processes, the team must utilize modalities of flexibility. Such measures include rotating schedules, modular subdivisions of time, alternate day rotations, as well as grouping and regrouping pupils for instruction. Using a block-of-time schedule, there is no limit to the options available to the team once members

understand their local options and the importance of the totality of the curriculum in the eyes of students. Flexibility is the key to delivering a meaningful program to students.

Teachers should also be responsible for evaluating the team process. Rather than bring in an external source, teachers get an opportunity to examine their role and function on a regular, systematic basis. Perhaps a peer can look at what works well for the team rather than an outsider who does not understand the uniqueness of that school or team, or the needs of that student body.

CURRICULUM AS A TEAM EFFORT

What emerges in the middle school is a team effort for delivering curriculum to students. In the elementary school, one teacher is responsible for all academic instruction. In the high school, subject matter teachers work in isolation. Thus, the middle school provides a transitional experience in which a team of teachers can present the total curriculum via a unified effort. Beyond the mechanical elements of teaming—such as agendas, modular subdivisions of time, conferences with parents, approaches to discipline, team-building activities, and subgroupings—the major focus of the teaming process should be the unification of the curricula.

Each subject routinely has its own curriculum guide with a scope and sequence for English 7, Algebra I, Science 6, or Technology Education 8. These guides are developed by experienced professionals who have mastery of content, pedagogy, and an awareness of student needs. Bulletins are developed to guide teachers in the current trends of addressing students in grades six, seven, and eight. If it were not for opportunities for correlation, the middle school experience might be more like the high school than it currently is.

To achieve a totality of curriculum, teachers must make day-to-day connections, correlations, and extensions of content, skills, and personal development issues, plus create interdisciplinary units. Correlations of content might include the English teacher teaching a novel set during the American Revolution while the social studies teacher is teaching that historical period; the

French and social studies teachers teaching the concept of revolution concurrently; or the art and music teachers working together to design scenery for a musical production.

In a unified fashion, teachers may address basic skills such as using manuscript form, setting up a notebook, following directions, and outlining. They may also address some of the thinking processes, such as problem solving, researching, and composing in a comprehensive way. All teachers of the grade level may address personal development topics, such as growing up in various cultures, resolving conflict, and helping the special needs person. In some schools, teachers work together to create and teach interdisciplinary units on space, water resources, United States history, telecommunications, and other topics.

Teachers who move beyond their responsibility to teach a specific subject in which they are certified can work together to create a total curriculum that addresses student needs. Within this arena, there are numerous opportunities for teaching thinking skills using content, a skills menu, and personal development elements that appear in the combined curriculum plan for all the subjects of that grade.

In addition to unique opportunities for curriculum development, implementation, and evaluation, teachers in the middle grades have unique opportunities to orchestrate the teaching of thinking throughout all courses. It is necessary, therefore, for teachers to recognize the potential of this comprehensive approach as they begin to identify appropriate teaching strategies with references for teaching thinking. No middle school teacher should approach the teaching of a specific strategy in isolation. Rather, there should be communication among all teachers to identify the most appropriate ways to teach these strategies concurrently.

APPROPRIATE STRATEGIES FOR TEACHING THINKING

A focus on teaching thinking skills via appropriate strategies for the early adolescent must be viewed in the context of student needs, an appropriate model for curriculum, and the team process. The

following techniques are appropriate for routine instruction of the early adolescent as well as for specific emphasis on teaching thinking.

Provide Clear, Concise Structure for all Activities

The early adolescent learner has a great need for structure. It must be evident in every aspect of the instructional process because the student must know exactly what to do for each activity. A teacher planning a vocabulary activity must review the directions orally and write them on the chalkboard so students can refer to them later, should the need arise.

From this common beginning point, the teacher can then ask a number of questions to promote the thinking process. Questions can reflect material previously taught as well as material to be presented. Teachers must also anticipate the kinds of questions students will ask as they complete a particular activity. Instructions should be given on a step-by-step basis, and teachers should not assume that all students can see the interrelationship between the steps. To promote critical and creative thinking, flow charts are helpful when teachers present a series of tasks to students. With structure, the student can perform various dimensions of the thinking process.

Clarify Purposes for Each Activity

Pupils must know exactly why they are asked to complete a certain activity or answer a particular question within the scope of an activity. For example, in mathematics, pupils must realize the importance of studying percents as readiness to answer a verifying question about the accuracy of a response. In science, students must know the importance of safety as they work with the Bunsen burner in an information-gathering activity.

If students are aware of purposes for learning new information, they are more willing to participate in activities and assess their performance in relationship to these purposes. Without a stated purpose, pupils may not show the necessary enthusiasm for completing a meaningful activity. The teaching of thinking must be fully integrated with purposes for each activity. The sequence of thinking skills activities must be designed to help students become increasingly independent learners.

Provide Adequate Motivation, Readiness, and Goal Setting

Once purposes are clearly established, teachers must make an overt effort to provide motivation and readiness that guarantee students are prepared for the thinking process. A specific effort to get pupils interested in the topic is often needed; it should be a concrete activity drawn from the realities of the early adolescent experience.

Teachers must monitor students' responses to motivational activities before continuing with any thinking process or core thinking skill in a lesson plan. Teachers who preplan key questions to establish the relationship between the purposes of the lesson and the motivational activity enhance both thinking and learning.

Effective readiness in the middle grades includes preparation for content as well as skills. The student should receive separate motivation for content and skill. By the conclusion of the readiness portion of the lesson, the pupil should clearly see the relationship between the content and skill and be prepared to complete the activity with a high degree of enthusiasm.

Instruction for middle-level students must be goal oriented. Goals relate to content, skills, and/or the personal development phases of middle school curriculum. Teachers enhance goal setting by asking questions that enable the student to see the connections between content, skills, and personal development.

Utilize Recall Strategies

Without a carefully structured routine, students will not be able to recall the content of previous lessons. A student may attend social studies class during period one on Friday and return for the next meeting period seven on Monday. Much time passes between these class meetings, and many events may happen in the student's life in that time.

Recall, therefore, must provide a very careful link between the most recent instruction in a subject and the thrust of today's lesson. Recall questions, however, do not always have to be lower-order questions. Teachers can provide opportunities for students to recall previous instruction and identify implications concurrently. Recall is generally accomplished via a

series of open-ended questions that help students see the connection between prior learning and the current lesson. The varying needs of students can be satisfied by altering the types of questions posed. Questions should require students to use various levels of thinking throughout the recall process. These questions should be individualized to the uniqueness of each student.

Provide Transitions to Connect Various Activities Within the Lesson

To satisfy the need for variety, an effective lesson for middle school students consists of several activities designed to accomplish one or more goals. Although the teacher may easily see the relationship between these activities, it is imperative that students recognize the relationships. Transitions make these connections.

An effective transition consists of a summary statement of the previous activity, a preview of the next activity, and an understanding of the relationship between the two parts. Knowledge, comprehension, application, analysis, synthesis, and evaluation questions may be used to facilitate transitions, which should be inductive whenever possible. A transition must be included to connect every activity in every lesson. Student thinking becomes focused as a function of these transitions.

Know the Cognitive Levels of Students

Middle school teachers must be as keenly aware of cognitive levels as they are of reading, mathematics, and IQ levels. Students in grades six, seven, and eight are typically at one of Piaget's stages of cognitive development. Piaget described a period of concrete operations in which students could comprehend concrete concepts or realities. This stage is followed by a period of formal operations in which students begin to hypothesize and use logic. All students do not enter these stages at the same time, and these stages can be subdivided as indicated by the terms *pre-operational*, *concrete onset*, *concrete mature*, *formal onset*, and *formal mature*.

Teachers should call on students at appropriate times in light of the students' cognitive levels. Meaningful questions about concrete material should be directed to students at pre-operational

or concrete onset. Questions that involve more abstract thinking should be reserved for those who are at formal onset or formal mature stages. Through critical and creative thinking, thinking processes, and core thinking skills, teachers have a responsibility to help expand students' cognitive levels. Although some students may never reach the formal mature status, middle school teachers should ask questions that are appropriate to the levels of their students' development and help students expand their thinking as much as possible.

Move from the Concrete to the Abstract in the Concept Development Process

Each activity should begin with a concrete example. Thus, lessons should move from the concrete or specific to the abstract or more general and theoretical. A simulation, picture, model, advertisement, or slide can be used to begin the thinking process. Whenever possible, teachers should permit students to see, feel, or touch these concrete examples. Knowledge and comprehension questions can be used to assess students' understanding of the concrete examples.

As the lesson unfolds, students should move their thinking to the abstract. Even though this may not be possible for every student, the teacher should facilitate movement in that direction but also keep in touch with students who may have difficulty going beyond the concrete. In exploring such abstract notions as democracy, photosynthesis, or irony, teachers must move slowly and assess student comprehension at regular intervals. Teachers should be able to assess cognitive levels of students, determine cognitive demands of curricula, and create a more appropriate match between the two.

Construct Effective Questions to Accomplish Objectives of the Lesson

Teachers must realize that the content of their questions affects how students process information. In preparing for instruction, teachers should plan key questions and include them in the formal lesson plan. To the greatest extent possible, questions should be open ended and designed to increase students' creative and critical thinking abilities.

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Specifically, teachers should conduct a self-assessment of their questions by asking the following:

- Are my questions clear and concise?
- Do they help achieve the objective of the lesson?
- Do I ask one question at a time?
- Do I ask each question only once?
- Do my questions elicit concepts as well as facts?
- Do I call on a student after the question has been asked?

Questions are often the key to the success of the lesson. Teachers must critically evaluate their skills in asking questions according to specific objectives of a lesson or activity. Questions play a major factor in moving from concrete to abstract, facilitating learning, and encouraging students to think.

Use Wait Time Effectively

Wait time is defined as the length of the silent period following the presentation of a question and prior to the initial student response to that question. Wait time also includes the time between a student response and the next student response. Typically, the average teacher waits only one second for an answer. But, a longer wait time has been found to have a positive effect on the quality of teacher-pupil interactions and achievement in science lessons. Teachers should extend pauses before beginning explanations, giving directions, asking questions, or reacting to pupils' talk. These pauses give each student additional time to formulate an answer. Thus, there is a greater chance for all students to participate in the ensuing discussion.

By increasing wait time to five seconds, teachers may anticipate (1) lengthier student responses, (2) whole sentence replies, (3) more student questions, (4) revised teacher expectations of students, and (5) a greater variety of teacher questions. The correlation between wait time and encouraging thinking skills is significant for early adolescent learners. These students might be reluctant to even try to answer a question if they assume someone else will be ready to answer earlier. In addition, self-concept of the early adolescent is enhanced when all students receive a more reasonable amount of time to react to stimuli and participate in the learning process.

Provide a Summary or Assessment

Middle school students depend on a summary at the end of each activity or lesson to announce closure. Thinking and learning are enhanced when there is a definite starting and stopping point for lessons or segments of lessons. It is essential that students are fully aware of the starting and stopping points of each activity during the fifty minutes of an English or social studies class.

Assessment can be accomplished by way of a specific activity or a series of directed questions. Students state what they learned during the lesson as well as what they anticipate happening next in the learning process. Assessment can be on a group or an individual basis. Teachers should answer all students' questions and concerns prior to dismissing class.

By analyzing student responses in the summary, the teacher can be comfortable knowing that concerns are resolved. Teachers can determine changes in student thinking and learning behaviors as they assess responses in a portion of the lesson. Finally, teachers should be aware of the kinds of thinking they expect students to demonstrate at each point in the lesson.

Facilitate Student-to-Student Interaction

Traditional secondary teaching has been characterized by a pattern of a teacher's statement followed by a student's statement. The teacher asks a question, a student answers the question, and then the teacher asks the next question. However, the middle school classroom should feature many opportunities for student-to-student interaction. Cooperative learning strategies respond to the learning needs of the early adolescent. Students should interact with one another on mathematic problems, science laboratory experiments, charts and graphs in social studies, and the plot of a novel in English. In these cooperative activities, pupils have an opportunity to practice information gathering, organizing, analyzing, integrating, and evaluating skills.

Assign Team Tasks

Teams or small-group tasks extend student-to-student interaction and involve groups of students working on specific thinking skills. This approach

responds to the social-emotional development of early adolescents, but it must be carefully supervised to keep competition in control. Team tasks are especially motivational for students who need peer pressure to expand their thinking horizons. Teachers of all subject areas are encouraged to find opportunities to teach thinking skills through small-group tasks. Time limits for these activities should then be clearly delineated.

Create Simulation and Game Techniques

Early adolescent students enjoy opportunities to enhance their thinking skills when teachers provide simulations and games within the structure of the classroom. Simulations and games provide all students the same readiness or prerequisites for thinking and learning. Social studies teachers have numerous opportunities to create simulations of topics in history, economics, or sociology. Technology education teachers utilize the assembly line process to encourage critical and creative thinking.

These simulations and games give all students a chance to experience an activity. After the simulation or game experience, the teacher may ask analysis, synthesis, and evaluation questions to help students comprehend and analyze what occurred. Beyond participation in the simulation, learning also takes place in the post-simulation thinking activities.

Anticipate and Prevent Problems

The successful middle school teacher anticipates problems that may occur in the classroom, on a field trip, or during any aspect of the learning process. By anticipating and preventing problems, the environment for learning is safer. Pupils are then willing to take the risks involved in learning. For example, pupils will try to answer a higher-order question when they feel the environment is secure and protected. Although initially leery of taking a risk, students will take a chance when student-teacher rapport is perceived to be positive. Thus, thinking is encouraged when the caring teacher provides the environment for students to take a risk.

Focus on Affective Issues

Thinking is enhanced when middle school teachers address affective or emotional topics that arise

in the course of the lesson. The science teacher may need to take a few minutes from the explanation of a scientific principle to resolve an altercation between two students in the classroom. A student who experienced abuse at home may feel comfortable sharing that information with the teacher. Thus, teachers should be concerned with affective issues, not just their subject matter. The more comfortable the student feels in a given classroom, the more likely it is the student will fully participate in the learning process.

Praise, Don't Criticize

Like adults, middle school students respond best to praise. All teachers must take the time to find ways to praise students in a manner that is accepted and respected by both the student receiving the praise and others in the classroom. Learning increases when teachers use a variety of terms to dispense praise, so as not to seem too mechanical. Although teachers are quick to point out shortcomings of students, they should find ways to inform parents of students' positive accomplishments. The appropriate use of praise reinforces and facilitates all aspects of the thinking and learning processes.

Appropriate strategies for teaching thinking are closely aligned with needs of the early adolescent learner. Some strategies can be utilized by every teacher in every classroom. Others may be utilized under certain conditions but in every content area. Some suggestions address the nature of the learning environment—a critical issue for the middle school student.

SUMMARY

Using the interdisciplinary team model, middle school teachers have unique opportunities to teach thinking skills in the context of the total curriculum. The early adolescent learner benefits when all teachers address common thinking skills within each subject. The development of these higher-level thinking skills enables all students to perform to their capacity in secondary education and beyond. Through team and faculty meetings, teachers can identify specific teaching strategies that respond to the physical, intellectual, social-emo-

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tional, and moral needs of this age group. Staff development should provide the entire faculty with the

precise modalities of skill development and concept formation appropriate to the middle-level student.

REFERENCES

- Alexander, W., Williams, E., Compton, M., Hines, V., Prescott, D., & Kealy, R. (1969). *The emergent middle school* (2nd ed.). New York: Holt, Rinehart and Winston.
- Baltimore County (Maryland) Public Schools. (1983). *1984 and beyond: A reaffirmation of values*. Towson, MD: Author.
- Baltimore County (Maryland) Public Schools. (1983). *Question power*. Towson, MD: Author.
- Fusco, E. and Associates. (1987). *Cognitive matched instruction in action*. Columbus, OH: National Middle School Association.
- Lomax, R. G., & Cooley, W. W. (1980). The student achievement instructional time relationship. Paper presented at the Annual Meeting of the American Educational Research Association, Boston, MA.
- Marzano, R. J., Brandt, R. S., Hughes, C., Jones, B. F., Presseisen, B., Rankin, S., & Suhor, C. (1988). *Dimensions of thinking: A framework for curriculum and instruction*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Merenbloom, E. Y. (1991). *The team process: A handbook for teachers*. Columbus, OH: National Middle School Association.
- Tobin, K. G. (1980). The effect of an extended teacher wait-time on science achievement. *Journal of Research in Science Teaching*, 17, 469-475.

CLASSROOM 2001: EVOLUTION, NOT REVOLUTION

James Bellanca

How will students in the 21st century learn? What will they learn? When and where will they learn it? First, it is likely that 21st-century students will trudge off to the same school buildings, file into the same classrooms, and spend the same hours each day as their 20th-century counterparts. On the other hand, it is also likely that the 21st-century students will work more regularly with electronic technology, pose and solve more problems, collaborate in more decisions about how they learn, evaluate more purposefully their own progress, and cover far more content than they would have done in the previous century. They are likely to integrate such learning in their efforts to research, organize information, and reason.

Whatever meaningful changes that come in the next decade will start in the classroom. There, teachers, provided with a different curriculum and new technology, will integrate instructional approaches to accomplish complex and thoughtful outcomes. Teachers such as Virginia's Pat Taylor, Chicago's Linda Gaddis, and Palatine's Elsie Brownawell will challenge children to learn how to learn, and how to transfer that learning.

Pat Taylor teaches geometry in a multi-age, heterogeneous secondary classroom in Chesterfield County, Virginia. Unlike her colleagues, who teach a sequence of chapters from the text, Taylor integrates geometry concepts such as "circles" with the thinking skill "estimating," and cooperative learning strategies. Using manipulatives to help her multi-ability and multi-age students grasp the meanings of radius, circumference, and pi as these relate to estimation of circle size, Taylor guides her students through a variety of hands-on tasks. At the formal lesson's end, each of Taylor's students return to a computer terminal to demonstrate the ability to solve abstract algorithms and apply the new concepts with a variety of visual and abstract software-generated estimation problems, and assess the quality of their problem solving.

Linda Gaddis, a Chicago teacher, works in a seventh grade science classroom filled with forty-two high-risk students. Because her school's mission focuses on basic skill achievement, she integrates the science lesson with reading comprehension. In one lesson, teams of students work with graphic webs to identify keys to survival in space from their reading

assignments. After discussing the pros and cons of their ideas, Gaddis moves among the student groups. At one station she helps students rethink problem-solving steps. At another she checks a print-out. At a third, she answers a question and redirects the students to a more appropriate application of their selection. The teams next move to four computer stations where they use a matrix to plan stories about their imaginary trips to space, help each other edit, and prepare all class presentations. After celebration of their accomplishments, she guides the groups in a thoughtful assessment of their work.

Elsie Brownawell teaches a kindergarten class with students from twelve cultures. This morning, she starts their science lesson with a review of yesterday's field trip. On a blackboard matrix, she writes the words her students use to describe the trees they examined on their walk. The matrix categorizes words that describe sights, sounds, smells, and touches. After the list is finished, Brownawell reviews pronunciation and meaning before she introduces a new word, "infer." She explains the word with several examples generated from her master terminal to an overhead screen. Next, she introduces their task. Because she has prepared them to work in cooperative groups, she is able to expedite their movement with a quick review of the task, the job each will do in group, and the cooperative rules. To each group, she hands a box, filled with mystery objects (leaves, bark), and a worksheet. The student teams go to work "inferring" what they find in each box. After the teams have worked with each box, ensuring that each member can pronounce the words, they return to their computer terminals to draw a picture that puts all the parts together. A touch screen enables them to label each part of the drawing. Brownawell works her way among the teams as she encourages, redirects their thinking with questions and comments, and helps them think about their thinking.

These vignettes describe engaged students guided by well-trained teachers skilled in a variety of instructional roles in their 1990s classrooms. The first half of each vignette describes a real lesson taught in the integrated instructional style the

teacher uses throughout the year. Cooperative learning, integrated curricula, thinking skills, and concept development are practices familiar to all their students. What these classrooms lack are the electronic tools to extend and to simplify the instruction in the manner described on the second half of each vignette.

The shift from 1990s-style instruction to instruction for the 21st century will require two essential changes. First, each classroom will need the electronic tools to extend and simplify both curriculum and instruction. Second, each classroom will need a teacher trained with the skills to manage integrated instruction and integrated curricula for all students without regard to ability, race, talent, special need, or motivation.

The electronic classroom will contain at least four multimedia computer workstations. At each station, networked software will enable students to gather information from a school library of print and graphic video materials to access databases external to the schoolplace; to process information with a variety of mindware work tools; and apply information in a variety of media formats. To supplement each computer station, the classroom will have hands-on science, art, and mathematics labs, a library of social studies and language arts books, video and computer projection machines, and audio and video recorders. Teachers will have the opportunity to use computer and video projector equipment for large-group instruction, displays, and feedback on student work. They will assign students to work in cooperative groups at the electronic workstations, at lab stations, or in discussion clusters. Most importantly, teachers will have management software that enables them to guide and assess individual and group progress through the increasingly divergent electronics curricula; develop a personal log with feedback from teacher assessments, self-assessments, and peer assessments; and construct an electronic portfolio that maps completed work and conceptual and social development.

Second, every classroom in 2001 will need a teacher well trained to integrate instruction in the electronic classroom. This means she or he will need to know how to best access curricular content,

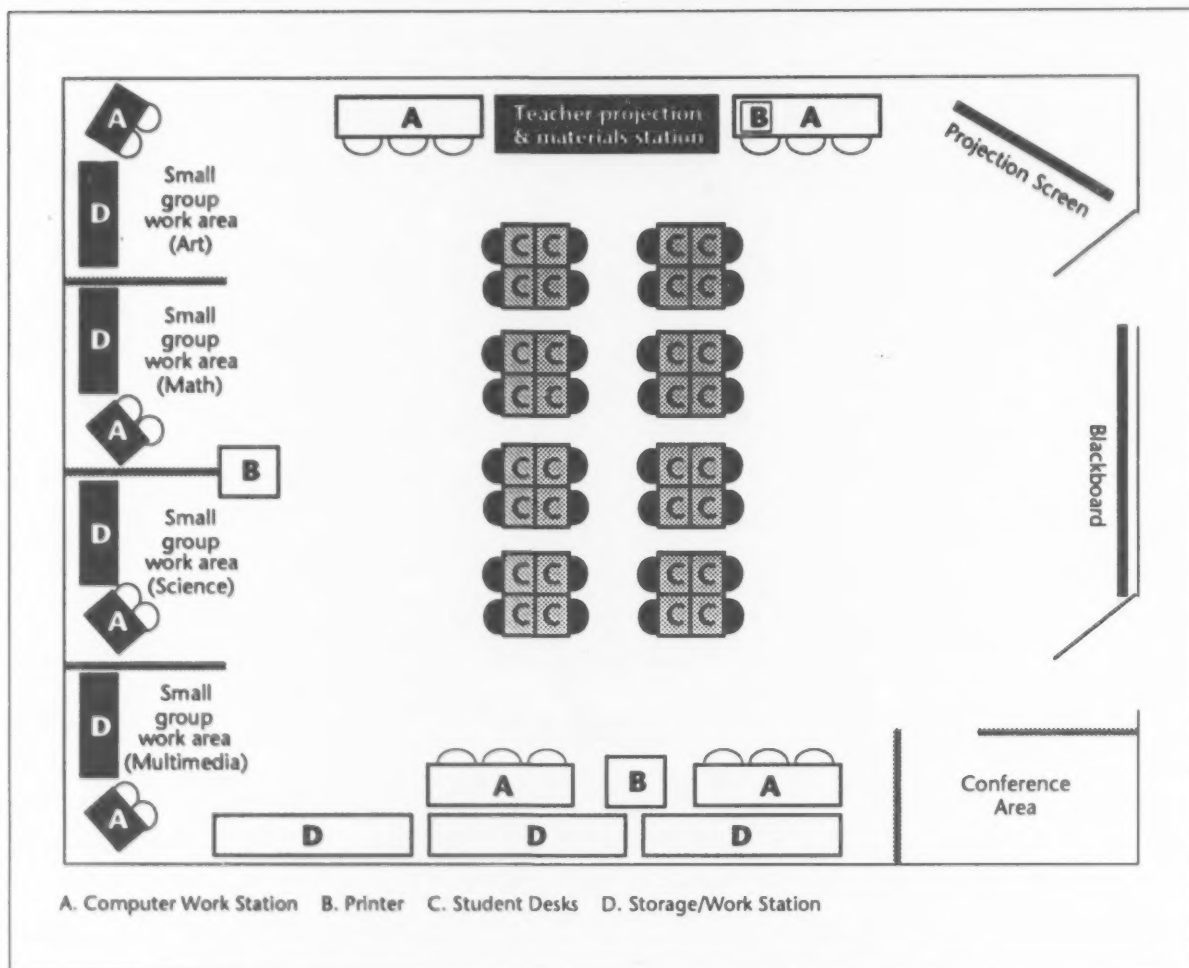


Figure 1 Classroom 2001

how to manipulate multi-media software, how to maintain a cooperative and creative work climate, how to structure computer-based inquiry across curricular areas, how to stimulate metacognitive transfer, and how to use the computer to assess and manage the individual progress of each student.

There are three predictable roadblocks that will slow this evolution: First, inadequate *hardware and software*; second, inadequate *staff development*; third, a prevailing *split view* of education.

The Software. The key to multimedia programs for the classroom is the CD-ROM. Current software and equipment is available, but at a high cost. As development of CD-ROM high-end graphics and video tools progresses, the availability of qual-

ity programs at lower cost will make it easier for schools to install electronic classrooms.

Staff Development. School districts will need to restructure how they think about staff development. In the best district staff development programs, there is an understanding that every teacher needs the opportunity to be a life-long learner. They know that the complexities of integrating cooperative learning, thinking, curricular areas, and technology require a financial commitment, time allocation, and a support system that go well beyond the scattered and unfocused development opportunities most 1990s teachers are provided. To foster the depth and extension of staff development needed for the electronic classroom,

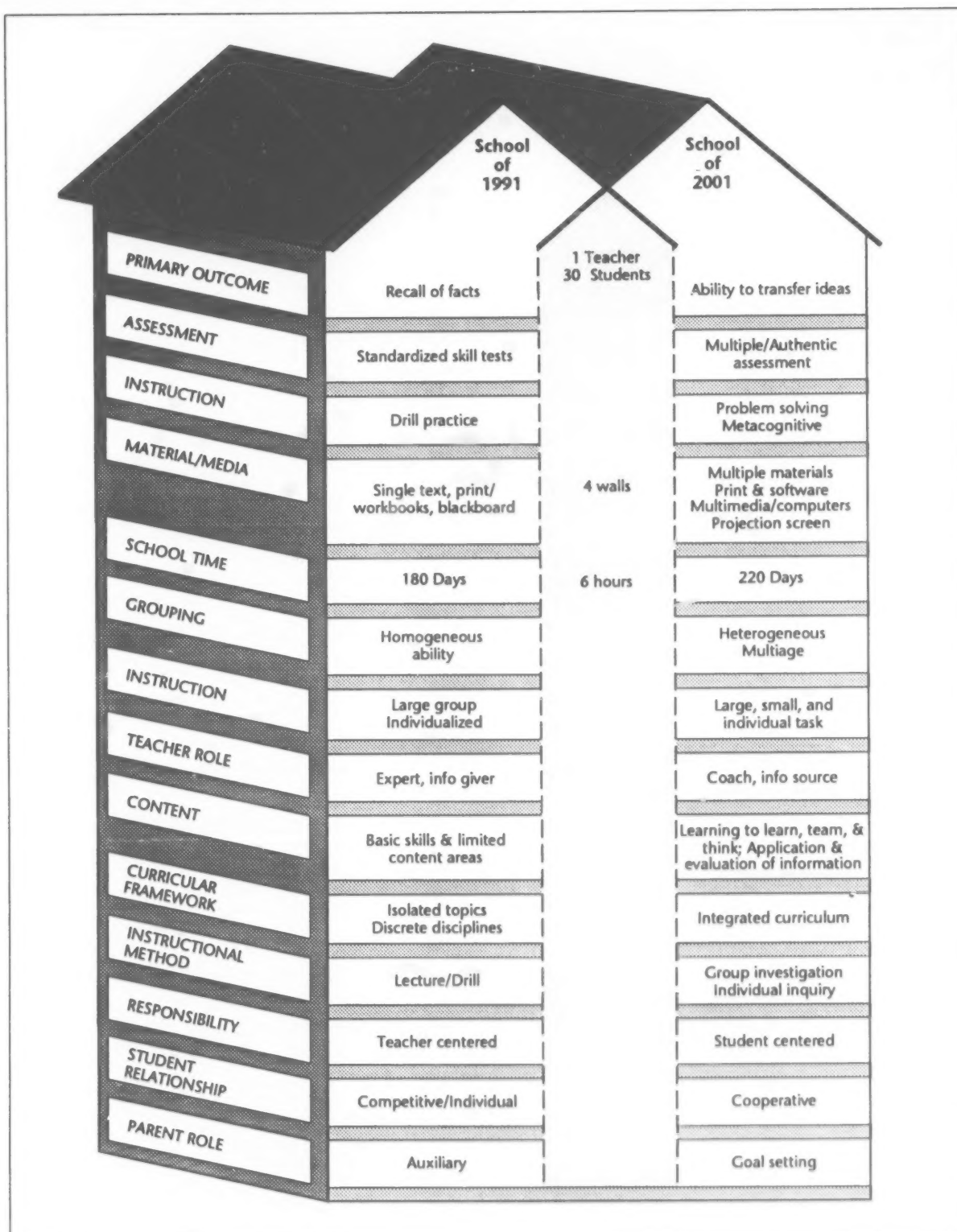


Figure 2 Comparing Present and Future

it is likely that districts will need to extend the school year by at least two weeks for no other purpose than staff development.

The Split View. This nation has a split view of education. On the one hand, some see the role of education as the mastery of basic skills. They want to use a battery of local, state, and national tests to ensure that "correct facts" and basic skills are acquired by all. Others argue that facts and skills, however necessary, are not sufficient for schooling in the 21st century. They argue for thinking, conceptualizing, cooperating, technology, and authentic assessment of the "whole" learner. If there is any chance for the elec-

tronic classroom to succeed, this either/or mindset must give way. It is important that basic skill development occur as students build toward more complex thinking tasks in all content areas.

This dual transformation is a process of evolution, not revolution. The three teacher examples described illustrate that a strong staff development program can move the theory into practice. As each of the teacher models attests, integrated instruction coupled with integrated curricula, electronic tools, and authentic assessment can result in students who are prepared for the 21st century. Step by step, instruction will change.

REFERENCES

- Bellanca, J. (1991). *Building a caring, cooperative classroom*. Palatine, IL: Skylight Publishing.
- Bellanca, J. (1990). *The cooperative think tank*. Palatine, IL: Skylight Publishing.
- Bellanca, J., & Fogarty, R. (1991). *Blueprints for thinking in the cooperative classroom*. Palatine, IL: Skylight Publishing.
- Brown, R. (1991). *Schools of thought: How the politics of literacy shape thinking in the classroom*. San Francisco: Jossey-Bass.
- Brownlie, F., Close, S., & Wingren, L. (1990). *Tomorrow's classroom today: Strategies for creating active readers, writers, and thinkers*. Markham, Ontario: Pembroke.
- Costa, A. L. (1991). *The school as a home for the mind*. Palatine, IL: Skylight Publishing.
- Fogarty, R. (1991). *How to integrate the curricula*. Palatine, IL: Skylight Publishing.
- Fullan, M. G. (1991). *The new meaning of educational change*. New York: Teachers College Press.
- Hergert, L. F., Phlegar, J. M., & Pérez-Sellés, M. E. (1991). *Kindle the spark: An action guide for schools committed to the success of every child*. Andover, MA: The Regional Laboratory for Educational Improvement of the Northeast and Islands.
- North Central Regional Educational Laboratory. (1990). *Restructuring to promote learning in America's schools* (nine-part video series). Oak Brook, IL: Author.
- Sarason, S. B. (1990). *The predictable failure of educational reform: Can we change course before it's too late?* San Francisco: Jossey-Bass.
- Spencer, L. S. (1989). *Winning through participation: Meeting the challenge of corporate change with the technology of participation*. Dubuque, IA: Kendall/Hunt.

SECTION TWO

CREATING COOPERATIVE LEARNERS

The ancient fable, "The Lion and the Mouse" provides insights about the value of living, working, and learning together. The mighty king of beasts captures a tiny mouse. The frightened mouse begs for her life. Moved by her pleas, her logic, and his own vanity, the lion roars with laughter, but sets the mouse free. Sometime later, while wandering through the forest, the mouse hears again the lion's mighty roar. This time, however, the mouse notices a cry laced with fear and pain. Investigating, the mouse finds the mighty lion trapped in a hunter's net. As human voices grow nearer, the mouse springs into action and gnaws through the ropes until the thankful lion springs free. Enlightened by his experience with the mouse's quiet courage, the mighty lion understands how caring can provide a special strength, a strength that in all his royalty he did not possess.

At first glance, the lion and the mouse seem to have little in common. Yet, the great king of beasts learns that his natural gifts are not the sole solution to every problem. Likewise, the tiny mouse, who appears so ineffectual and dependent, discovers she has mighty gifts that are indeed necessary for survival. Her quick thinking under pressure, her ability to chew, her size, her courage, and her willingness to sacrifice upstage the lion's "I can do it all myself" individualism.

 When first introduced to cooperative learning, some students complain, "Why do we have to work with _____?" Like the lion, a significant number of students look superficially at their peers, make snap judgments, and strive to preserve their own self-centered, individualistic ways. Cooperative learning, when well-implemented in the classroom, enables these lion-like individualists to discover the value of accepting different talents and skills as valuable tools for learning. In essence, just as the mighty lion and the little mouse discovered the wonderment of

collaboration, so too students in cooperative classrooms can learn the value of using their seemingly divergent talents and skills in constructive concert.

Cooperative learning has been cited as a means for developing intellectual skills. In this section, Johnson and Johnson support this contention. They note that there are strong positive effects on achievement as well as the ability to think critically, to perform higher-order thinking, to display more effective reasoning, and to think more creatively when working in a group. Other authors bear out the Johnsons' research with supportive descriptions from practice. They indicate that problem-solving and critical-thinking skills can best be experienced, practiced, analyzed, and applied in collaborative settings.

However, these behaviors should be considered more than mere by-products of teaching cooperative learning; they should become the intentions, goals, and outcomes of cooperative learning.

Every function in... cultural development appears twice: first, on the social level, and later on the individual level; first between people (interpsychological), and then inside (intrapsychological).

—Vygotsky, 1978

This capacity is called "co-cognition"—the capacity to think together. Co-cognition is a particularly fitting concept since the workplace our students will experience in the future will necessitate group problem-solving skills. The growth of intelligence of individuals and of organizations depends on their ability to think together: to resolve conflicts, empathize, value diversity of opinion, and seek consensus. As the articles in this section attest, the payoffs are powerful and far-removed from practices that simply "get students into groups."

COOPERATIVE LEARNING: A THEORY BASE

David W. Johnson and Roger T. Johnson

Research on social interdependence began in the late 1800s when Triplett in the United States, Turner in England, and Mayer in Germany conducted a series of studies on the factors associated with competitive performance. Research on group versus individual performance dominated in the 1920s and 1930s, leading to a review of the research on cooperation and competition by May and Doob (1937). In the 1940s Morton Deutsch, building on the theorizing of Kurt Lewin, proposed a theory of cooperation and competition that has served as the primary foundation on which subsequent research and discussion of cooperative learning has been based. Our own theorizing and research is directly based on Deutsch's work. During the past ninety years over 550 experimental and 100 correlational studies have been conducted by a wide variety of researchers, with different age subjects, in different subject areas, and in different settings (see Johnson & Johnson, 1989a, for a complete listing and review of these studies). In our own research program at the Cooperative Learning Center at the University of Minnesota, over the past twenty-five years we have conducted over eighty-five studies to refine

our understanding of how cooperation works. We know far more about the efficacy of cooperative learning than we know about lecturing, departmentalization, the use of technology, or almost any other facet of education. With the amount of research evidence available, it is surprising and even alarming that classroom practice is so oriented toward individualistic and competitive learning. It is time for the discrepancy to be reduced between what research indicates is effective and what students, teachers, and administrators actually do.

This chapter presents a broad overview of the theory and research on cooperative learning as a research-based school practice. Cooperation has been blessed with a well-formulated, strategic, and powerful theory and considerable research evidence verifying its effectiveness. The research has also identified a series of variables mediating the efficacy of cooperation. There have been numerous operationalizations of cooperative learning developed, which may be classified along a continuum of direct to conceptual approaches. Finally, what is good for students is even better for faculty. Cooperative learning is part of a basic change in organizational structure from a competitive-indi-

vidualistic, "mass manufacturing" model of organizing to a high-performance, team-based organizational structure.

DEFINITION OF SOCIAL INTERDEPENDENCE

Together we stand, divided we fall.—Watchword of the American Revolution

Social interdependence exists when the outcomes of individuals are affected by each other's actions (Johnson & Johnson, 1989a). There are two types of social interdependence: cooperative, which is based on positive interdependence, and competitive, which is based on negative interdependence. Interdependence may be differentiated from dependence and independence. **Social dependence** exists when the outcomes of Person A are affected by Person B's actions, but the reverse is not true. **Social independence** exists when individuals' outcomes are unaffected by each other's actions. The absence of social interdependence and dependence results in individualistic efforts. **Cooperation** is working together to accomplish shared goals. In cooperative situations, the goal attainments of participants are positively correlated; individuals perceive that they can reach their goals if and only if the other group members also do so (Deutsch, 1949). Thus, an individual seeks an outcome that is personally beneficial and beneficial to all other individuals with whom the person is cooperatively linked. **Competition** is individuals working against each other to achieve a goal that only one or a few can attain. In competitive situations, the goals of the separate participants are so linked that there is a negative correlation among their goal attainments; each individual perceives that he or she can reach his or her goal if and only if the other participants cannot attain their goals (Deutsch, 1949). Thus, individuals seek an outcome that is personally beneficial but detrimental to all others in the situation. **Individualistic efforts** exist when individuals work by themselves to accomplish goals unrelated to those of others. In individualistic situations, there is no correlation among participants' goal attainments; each individual perceives that he

or she can reach his or her goal regardless of whether other individuals attain their goals (Deutsch, 1962; Johnson & Johnson, 1975/1991). Thus individuals seek an outcome that is personally beneficial.

In the ideal classroom, all students would learn how to work cooperatively with others, compete for fun and enjoyment, and work autonomously on their own. The teacher decides which goal structure to implement within each lesson. Two interrelated questions are: (a) under what conditions will cooperative, competitive, and individualistic efforts affect desired instruction outcomes, and (b) what variables mediate the effectiveness of these efforts. In considering these two questions, only cooperation is dealt with in this chapter. The conditions under which competitive and individualistic learning may be productively used are discussed in Johnson and Johnson (1975/1991). This chapter focuses on the appropriate use of cooperation, as it is the most powerful and important, and least utilized, of the three.

WHAT DO WE KNOW ABOUT COOPERATIVE EFFORTS?

Everyone has to work together; if we can't get everybody working toward common goals, nothing is going to happen.—Harold K. Sperlich, President, Chrysler Corporation

Deutsch's original theory (1949) has served as a major conceptual structure for this area of inquiry for the past forty years. His pioneering theory and research evolved from Kurt Lewin's field theory (1935, 1948). Lewin stated that the essence of a group is the interdependence among members (created by common goals), which results in the group being a "dynamic whole" so that a change in the state of any member or subgroup changes the state of any other member or subgroup. He also noted that an intrinsic state of tension between group members motivates movement toward the accomplishment of the desired common goals.

Deutsch (1949, 1962), in his theory of how the tension systems of different people may be interrelated, conceptualized two types of social inter-

dependence—cooperative and competitive. He defined individualistic efforts as the absence of interdependence. Deutsch's theory was based on two basic continua: one relating to the type of interdependence among the goals of the people involved in a given situation and one relating to the type of actions taken by the people involved. He identified as the ends of one continuum two basic types of goal interdependence. One is promotive: where the goals are positively linked in such a way that the probability of one person obtaining his or her goal is positively correlated with the probability of others' obtaining their goals. The other is contrient: where goals are negatively linked in such a way that the probability of one person obtaining his or her goal is negatively correlated with the probability of others' obtaining their goals. He identified as the ends of the second continuum two basic types of actions by an individual: effective (which improves the person's chances of obtaining a goal) and bungling (which decreases the person's chances of obtaining a goal).

He then combined the two continua to posit how they jointly affect three basic social psychological processes: substitutability, cathexis (i.e., the investment of psychological energy in objects and events outside of oneself), and inducibility (i.e., openness to influence). Essentially, in cooperative situations the actions of participants substitute for each other, participants positively cathect to each other's effective actions, and there is high inducibility among participants. In competitive situations the actions of participants do not substitute for each other, participants negatively cathect to each other's effective actions, and inducibility is low.

Building on Deutsch's theorizing, the premise may be made that the type of interdependence structured among students determines how they interact with each other. This, in turn, largely determines instructional outcomes (Johnson, 1979; Johnson & Johnson, 1974, 1989a). Structuring situations cooperatively results in promotive interaction; structuring situations competitively results in oppositional interaction; and structuring situations individualistically results in no interaction among students. These interaction patterns affect numerous variables, which may be subsumed

within the three broad and interrelated outcomes of effort exerted to achieve, quality of relationships among participants, and participants' psychological adjustment and social competence (see Figure 1).

INTERACTION PATTERNS

Two heads are better than one.

Simply placing students near each other and allowing interaction to take place does not mean that learning will be maximized; high-quality peer relationships will result; or student psychological adjustment, self-esteem, and social competencies will be maximized. Students can obstruct as well as facilitate each other's learning. Or they can ignore each other. The way students interact depends on how faculty members structure interdependence in the learning situation.

Positive interdependence results in students promoting each other's learning and achievement. Promotive interaction may be defined as individuals encouraging and facilitating each other's efforts to achieve, complete tasks, and produce in order to reach the group's goals. Positive interdependence in and of itself may have some effect on outcomes. However, it is the face-to-face promotive interaction among individuals, fostered by the positive interdependence, that most powerfully influences efforts to achieve, caring and committed relationships, and psychological adjustment and social competence. Students focus both on increasing their own achievement and on increasing the achievement of their fellow group members. Promotive interaction is characterized by individuals:

1. Providing each other with efficient and effective help and assistance.
2. Exchanging needed resources such as information and materials and processing information more efficiently and effectively.
3. Providing each other with feedback in order to improve the subsequent performance of their assigned tasks and responsibilities.
4. Challenging each other's conclusions and reasoning in order to promote higher quality

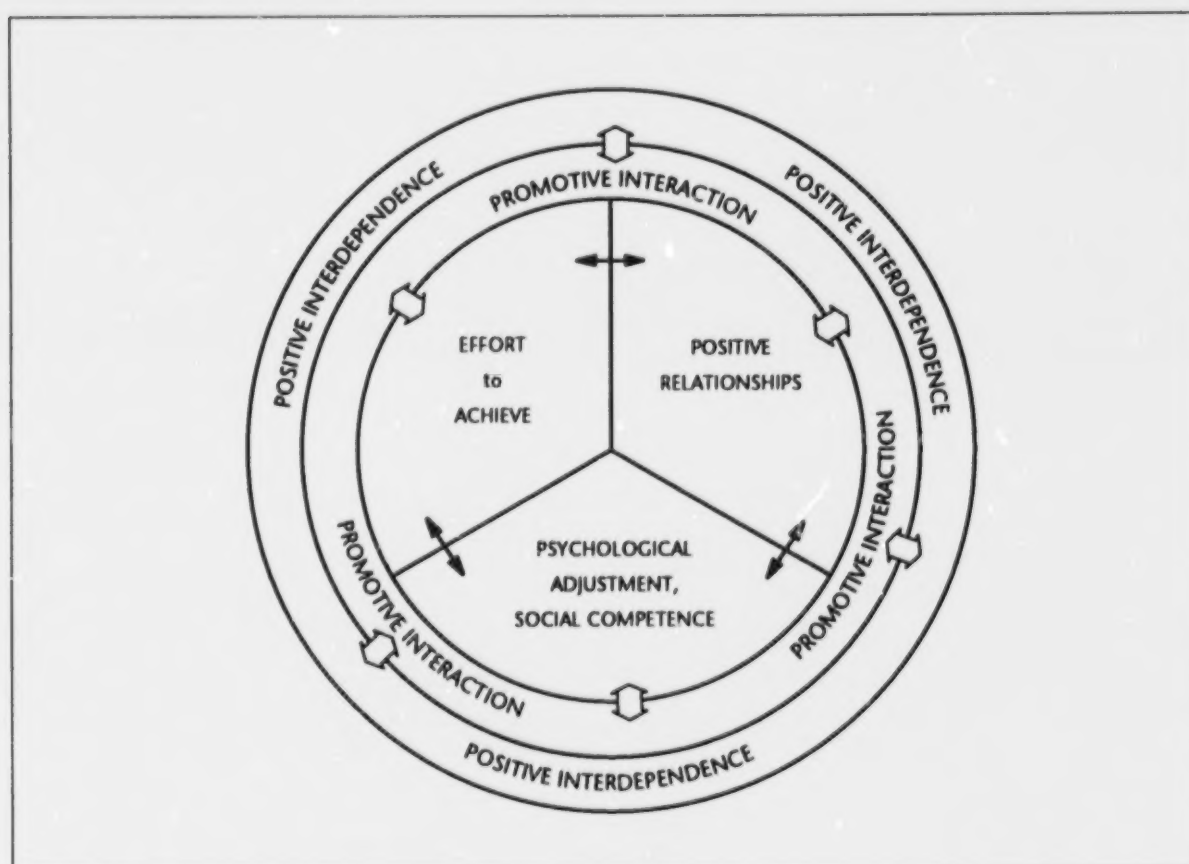


Figure 1 Outcomes of Cooperative Learning (Johnson & Johnson, 1989a).

decision making and greater insight into the problems being considered.

5. Advocating the exertion of effort to achieve mutual goals.
6. Influencing each other's efforts to achieve the group's goals.
7. Acting in trusting and trustworthy ways.
8. Being motivated to strive for mutual benefit.
9. Having a moderate level of arousal characterized by low anxiety and stress. (Johnson & Johnson, 1989a)

Negative interdependence typically results in students opposing and obstructing each other's learning. Oppositional interaction occurs as students discourage and obstruct each other's efforts to achieve. Students focus both on increasing their own achievement and on preventing any classmate

from achieving more than they do. No interaction exists when students work independently without any interaction or interchange with each other. Students focus only on increasing their own achievement and ignore as irrelevant the efforts of others.

OUTCOMES

A faithful friend is a strong defense, and he that hath found him, hath found a treasure.— Ecclesiastes 6:14

Different learning outcomes result from the student-to-student interaction patterns promoted by the use of cooperative, competitive, and individualistic goal structures (Johnson & Johnson, 1989a). The numerous outcomes of cooperative efforts are broadly categorized into three groups: effort to

	mean	standard deviation	norm
TOTAL STUDIES			
Cooperative vs. Competitive	0.67	0.93	129
Cooperative vs. Individualistic	0.64	0.79	184
Competitive vs. Individualistic	0.30	0.77	38
HIGH QUALITY STUDIES			
Cooperative vs. Competitive	0.88	1.13	51
Cooperative vs. Individualistic	0.61	0.63	104
Competitive vs. Individualistic	0.07	0.61	24
MIXED OPERATIONALIZATIONS			
Cooperative vs. Competitive	0.40	0.62	23
Cooperative vs. Individualistic	0.42	0.65	12
PURE OPERATIONALIZATIONS			
Cooperative vs. Competitive	0.71	1.01	96
Cooperative vs. Individualistic	0.65	0.81	164

Table 1 Mean Effect Sizes for Social Interdependence and Achievement (Johnson & Johnson, 1989a).

achieve, positive interpersonal relationships, and psychological adjustment. Since research participants have varied as to economic class, age, sex, and cultural background, since a wide variety of research tasks and measures of the dependent variables have been used, and since the research has been conducted by many different researchers with markedly different orientations working in different settings and in different decades, the overall body of research on social interdependence has considerable generalizability.

Over 375 studies on achievement have been conducted over the past ninety years to give an answer to the question of how successful competitive, individualistic, and cooperative efforts are in promoting productivity and achievement (see Table 1). The results are expressed in effect sizes that show the strength of the relationship between social interdependence and achievement. The effect sizes shown in the tables are corrected for differences in variances, sample sizes, and number of findings per study.

Working together to achieve a common goal produces higher achievement and greater productivity than does working alone. This is so well confirmed by so much research that it stands as one of the strongest principles of social and organizational psychology. Not all the research, however, has been carefully conducted. The methodological shortcomings found within many research studies may significantly reduce the certainty of the conclusion that cooperative efforts produce higher achievement than do competitive or individualistic efforts. Thus, the results of well-conducted studies—in which individuals were randomly assigned to conditions, in which there was an unambiguous and well-defined control condition, in which teacher and curriculum effects were controlled for, and in which it was verified that the experimental and control conditions were successfully implemented—were analyzed together. When only the methodologically high-quality studies are included, the results are consistent with the overall findings. Cooperative learning, furthermore, results in more

	mean	standard deviation	norm
TOTAL STUDIES			
Cooperative vs. Competitive	0.67	0.49	93
Cooperative vs. Individualistic	0.60	0.58	60
Competitive vs. Individualistic	0.08	0.70	15
HIGH QUALITY STUDIES			
Cooperative vs. Competitive	0.82	0.40	37
Cooperative vs. Individualistic	0.62	0.53	44
Competitive vs. Individualistic	0.27	0.60	11
MIXED OPERATIONALIZATIONS			
Cooperative vs. Competitive	0.46	0.29	37
Cooperative vs. Individualistic	0.36	0.45	10
PURE OPERATIONALIZATIONS			
Cooperative vs. Competitive	0.79	0.56	54
Cooperative vs. Individualistic	0.66	0.60	49

Table 2 Mean Effect Sizes for Social Interdependence and Interpersonal Attraction (Johnson & Johnson, 1989a).

higher-level reasoning, more frequent generation of new ideas and solutions (i.e., process gain), and greater transfer of what is learned within one situation to another (i.e., group-to-individual transfer) than does competitive or individualistic learning. The superiority of cooperative learning over competitive and individualistic learning increases under the following conditions: when the task is more conceptual, when greater problem solving is required, when greater value is placed on higher-level reasoning and critical thinking, when creative answers are required, when long-term retention is desired, and when the application of what was learned is required.

Some cooperative learning procedures contain a mixture of cooperative, competitive, and individualistic efforts while others contain pure cooperation. The original jigsaw procedure (Aronson et al., 1978), for example, is a combination of resource interdependence (cooperative) and individual reward structure (individualistic). Teams-Games-Tournaments (DeVries & Edwards, 1974) and Student-Teams-Achievement-Divisions (Slavin,

1980) are mixtures of cooperation and intergroup competition. Team-Assisted-Instruction (Slavin, Leavey, & Madden, 1982) is a mixture of individualistic and cooperative learning. When the results of "pure" and "mixed" operationalizations of cooperative learning were compared, the pure operationalizations produced higher achievement.

Individuals care more about each other and are more committed to each other's success and well-being when they work together to get the job done than when they compete to see who is best or work independently from each other (see Table 2). This is true when individuals are homogeneous. It is also true when individuals differ in intellectual ability, handicapped conditions, ethnicity, social class, and gender. When individuals are heterogeneous, cooperating on a task results in more realistic and positive views of each other. It also results in more social support (see Table 3). Cooperative learning has been demonstrated to be an essential prerequisite for ethnic integration and mainstreaming. As relationships become more positive, absenteeism and turnover of membership decrease, member

	mean	standard deviation	norm
TOTAL STUDIES			
Cooperative vs. Competitive	0.62	0.44	84
Cooperative vs. Individualistic	0.70	0.45	72
Competitive vs. Individualistic	-0.13	0.36	19
HIGH QUALITY STUDIES			
Cooperative vs. Competitive	0.83	0.46	41
Cooperative vs. Individualistic	0.72	0.47	62
Competitive vs. Individualistic	-0.13	0.36	19
MIXED OPERATIONALIZATIONS			
Cooperative vs. Competitive	0.45	0.23	16
Cooperative vs. Individualistic	0.02	0.35	6
PURE OPERATIONALIZATIONS			
Cooperative vs. Competitive	0.73	0.46	58
Cooperative vs. Individualistic	0.77	0.40	65

Table 3 Mean Effect Sizes for Social Interdependence and Social Support (Johnson & Johnson, 1989a).

commitment to organizational goals increases, feelings of personal responsibility to the organization increase, willingness to take on difficult tasks increases, and motivation and persistence in working toward goal achievement increase. Also increased are satisfaction and morale, willingness to endure pain and frustration on behalf of the organization, willingness to defend the organization against external criticism or attack, willingness to listen to and be influenced by colleagues, commitment to each other's professional growth and success, and productivity (Johnson & F. Johnson, 1991; Johnson & Johnson, 1989a; Watson & Johnson, 1972).

Working cooperatively with peers and valuing cooperation result in greater psychological health and higher self-esteem than do competing with peers or working independently (see Table 4). Personal ego-strength, self-confidence, independence, and autonomy are all promoted by being involved in cooperative efforts with caring people who are committed to each other's success and well-being and who respect each other as separate and unique individuals. When individuals work together to

complete assignments, they interact (mastering social skills and competencies), they promote each other's success (gaining self-worth), and they form personal as well as professional relationships (creating the basis for healthy social development). Individuals' psychological adjustment and health tend to increase when schools are dominated by cooperative efforts. The more individuals work cooperatively with others, the more they see themselves as worthwhile and as having value. They also demonstrate greater productivity, greater acceptance and support of others, and greater autonomy and independence. Cooperative experiences are not a luxury. They are an absolute necessity for the healthy development of individuals who can function independently.

There are bidirectional relationships between efforts to achieve, quality of relationships, and psychological health (Johnson & Johnson, 1989a). Each influences the others. First, caring and committed friendships come from a sense of mutual accomplishment, mutual pride in joint work, and the bonding that results from joint efforts. The

	mean	standard deviation	norm
TOTAL STUDIES			
Cooperative vs. Competitive	0.58	0.56	56
Cooperative vs. Individualistic	0.44	0.40	38
Competitive vs. Individualistic	-0.23	0.42	19
HIGH QUALITY STUDIES			
Cooperative vs. Competitive	0.67	0.31	24
Cooperative vs. Individualistic	0.45	0.44	29
Competitive vs. Individualistic	-0.25	0.46	13
MIXED OPERATIONALIZATIONS			
Cooperative vs. Competitive	0.33	0.39	17
Cooperative vs. Individualistic	0.22	0.38	9
PURE OPERATIONALIZATIONS			
Cooperative vs. Competitive	0.74	0.59	36
Cooperative vs. Individualistic	0.51	0.40	27

Table 4 Mean Effect Sizes for Social Interdependence and Self-Esteem (Johnson & Johnson, 1989a).

more students care about each other, the harder they will work to achieve mutual learning goals. Second, joint efforts to achieve mutual goals promote higher self-esteem, self-efficacy, personal control, and confidence in individual competencies. The more psychologically healthy individuals are, the better able they are to work with others to achieve mutual goals. Third, psychological health is built on the internalization of the caring and respect received from loved ones.

Friendships are developmental advantages that promote self-esteem, self-efficacy, and general psychological adjustment. The healthier people are psychologically (i.e., free of such psychological pathologies as depression, paranoia, anxiety, fear of failure, repressed anger, hopelessness, and a sense of meaninglessness), the more caring and committed their relationships. Since each outcome can induce the others, they are likely to be found together. They are a package with each outcome a door into all three. Together they induce positive interdependence and promotive interaction.

WHAT MEDIATES?

The critical issue in understanding the relationship between cooperation and its outcomes is specifying the variables that mediate the relationship. Simply placing students in groups and telling them to work together does not in and of itself promote higher achievement. There are many ways in which group efforts may go wrong. Less able members sometimes "leave it to George" to complete the group's tasks, thus creating a free rider effect (Kerr & Bruun, 1981) whereby group members expend decreasing amounts of effort and just go through the team-work motions. At the same time, the more able group members may expend less effort to avoid the sucker effect of doing all the work (Kerr, 1983). High-ability group members may be deferred to and may take over the important leadership roles in ways that benefit them at the expense of the other group members (the rich-get-richer effect). In a learning group, for example, a more able group member may give all the explanations of what is being learned. Since the amount of

time spent explaining correlates highly with the amount learned, a more able member learns a great deal while less able members flounder as a captive audience. The time spent listening in group brainstorming can reduce the amount of time in which any individual can state their ideas (Hill, 1982; Lamm & Trommsdorf, 1973). Group efforts can be characterized by self-induced helplessness (Langer & Benevento, 1978), diffusion of responsibility and social loafing (Latane, Williams, & Harkins, 1979), ganging up against a task, reactance (Salomon, 1981), dysfunctional divisions of labor ("I'm the thinkist and you're the typist"; Sheingold, Hawkins, & Char, 1984), inappropriate dependence on authority (Webb, Ender, & Lewis, 1986), destructive conflict (Collins, 1970; Johnson & Johnson, 1979), and other patterns of behavior that debilitate group performance.

It is only under certain conditions that group efforts may be expected to be more productive than individual efforts. Those conditions are:

- Clearly perceived positive interdependence.
- Considerable promotive (face-to-face) interaction.
- Acknowledged personal responsibility (individual accountability) to achieve the group's goals.
- Frequent use of relevant interpersonal and small group skills.
- Periodic and regular group processing.

POSITIVE INTERDEPENDENCE

The first step in promoting cooperation among students is to structure positive interdependence within the learning situation. Positive interdependence exists when one perceives that one is linked with others in a way so that one cannot succeed unless they do (and vice versa) or that one must coordinate one's efforts with the efforts of others to complete a task (Johnson & Johnson, 1989a). Positive interdependence is the most important factor in structuring learning situations cooperatively. If students do not believe that they "sink or swim to-

gether," then the lesson is not cooperative. When students are placed in learning groups but no positive interdependence is structured, the learning situation is not cooperative; it is either competitive or individualistic with talking. Under those conditions, there is no reason to expect groups to outperform individuals. In fact, the opposite may be true.

There are two major categories of interdependence: outcome interdependence and means interdependence (Deutsch, 1949; Johnson & Johnson, 1989a; Thomas, 1957). How students behave in a learning situation is largely determined by their perceptions of the outcomes desired and the means by which the desired goals may be reached. When persons are in a cooperative or competitive situation, they are oriented toward a desired **outcome**, end state, goal, or reward. If there is no outcome interdependence (goal and reward interdependence), there is no cooperation or competition. Outcome interdependence includes:

- **Goal interdependence:** individuals perceive that they can attain their goals if and only if the other individuals with whom they are cooperatively linked attain their goals. Goal interdependence subsumes **outside enemy interdependence**—striving to perform higher than other groups—and **fantasy interdependence**—striving to solve hypothetical problems such as how to deal with being shipwrecked on the moon.
- **Reward interdependence:** each group member receives the same reward for successfully completing a joint task.

The means through which the mutual goals or rewards are to be accomplished specify the actions required on the part of group members. Means interdependence includes:

- **Resource interdependence:** each member has only a portion of the information, materials, or resources necessary for the task to be completed, and members' resources have to be combined in order for the group to achieve its goal.

- **Role interdependence:** members are assigned complementary and interconnected roles.
- **Task interdependence:** a division of labor is created so that the actions of one group member have to be completed if the next group member is to complete his or her responsibilities.

Positive outcome interdependence results in group members realizing the following (Johnson & Johnson, 1989a):

- Members share a common fate where they all gain or lose on the basis of the overall performance of group members. One result is a sense of personal responsibility for the final outcome, and for doing their share of the work.
- They strive for mutual benefit so that all members of the group will gain. There is recognition that what helps other members benefits oneself and what promotes one's own productivity benefits the other group members.
- Group members have a long-term time perspective. Long-term joint productivity is perceived to be of greater value than short-term personal advantage.
- Individuals have a shared identity based on group membership. The shared identity binds members together emotionally and creates an expectation for a joint celebration based on mutual respect and appreciation for the success of group members. The experience creates a positive cathexis so that group members like each other. Feelings of success are shared and pride is taken in other members' accomplishments as well as one's own.

Positive means interdependence results in individuals realizing that the performance of group members is mutually caused. No member is on his or her own. Each member shares responsibility for other members' productivity (mutual responsibility) and is obligated to other members for their support and assistance (mutual obligation). As a result of the mutual causation, cooperative efforts are characterized by positive inducibility in that

group members are open to being influenced by each other and substitutability in that the actions of group members substitute for each other so that if one member of the group has taken the action there is no need for other members to do so. There is a mutual investment in each other.

Positive interdependence has numerous effects on individuals' motivation and productivity, not the least of which is that the efforts of all group members are needed for group success. When members of a group see their efforts as dispensable for the group's success, they may reduce their efforts (Kerr & Bruun, 1981; Kerr, 1983; Sweeney, 1973). When group members perceive their potential contribution to the group as being unique, they increase their efforts (Harkins & Petty, 1982). When goal, task, resource, and role interdependence are clearly understood, individuals realize that their efforts are required in order for the group to succeed and that their contributions are often unique. In addition, reward interdependence needs to be structured to ensure that one member's efforts do not make the efforts of other members unnecessary. If the highest score in the group determines the group grade, for example, low-ability members might see their efforts as unnecessary and thus contribute minimally. High-ability members might feel exploited and become demoralized and therefore decrease their efforts so as not to provide undeserved rewards for irresponsible and ungrateful "free-riders" (Kerr, 1983).

Finally, positive interdependence creates motives that enhance and complement each other. Affiliation needs and the desire to be involved in relations with others, for example, may operate directly to increase productivity and psychological health in cooperative situations.

Within the literature on positive interdependence, two controversies are: (a) whether goal or reward interdependence is the key to operationalizing outcome interdependence, and (b) whether resource interdependence is effective in the absence of outcome interdependence.

Goal vs. Reward Interdependence

There is a basic theoretical disagreement among researchers as to whether positive goal interdepen-

dence or positive reward interdependence mediate the relationship between cooperation and achievement. On the one side of the controversy are Deutsch (1962) and Johnson and Johnson (1974, 1989a) who state that positive goal interdependence results in a positive interaction pattern among individuals, which increases their productivity and interpersonal attraction. From this perspective, given the perception of positive interdependence, individuals will act to facilitate each other's goal accomplishment, and increased achievement results. On the other side of the controversy are researchers such as Hayes (1976) and Slavin (1983) who state that positive reward interdependence largely explains the relationship between cooperation and achievement. From this perspective, individuals will increase their achievement only if there is a specific academic group contingency reinforcing them for doing so.

Contrasting the two theoretical positions is complicated by the fact that, while it is possible to implement positive goal interdependence without positive reward interdependence, reward interdependence cannot be implemented without goal interdependence. In order for group members to be motivated by a group contingency, they must first perceive that their goal accomplishments are positively interdependent. To contrast the two theoretical positions, cooperative learning groups with only positive goal interdependence have to be contrasted with cooperative groups with both positive goal and reward interdependence. In a series of recent studies, Deborah Mesch and Marvin Lew contrasted individualistic learning, positive goal interdependence alone, positive goal interdependence with an academic reward contingency, and positive goal interdependence with both an academic and a social skills reward contingency (Lew, Mesch, Johnson, & Johnson, 1986a, 1986b; Mesch, Johnson, & Johnson, 1988; Mesch, Lew, Johnson, & Johnson, 1986). They used an A-B-A reversal design in studies that lasted over twenty-one weeks, carefully observing conditions each week to ensure that they were being implemented correctly. Their studies took place in elementary, junior high, and high schools. They found that, while positive goal interdependence is sufficient to produce higher

achievement than individualistic learning, the combination of goal and reward interdependence is even more effective. The impact of the two types of outcome interdependence seems to be additive.

Goal vs. Resource Interdependence

Although few research studies have attempted to differentiate between the effects of positive goal interdependence and positive resource interdependence, some distinction may be made theoretically. There are two basic positions, one represented by Deutsch and the authors of this chapter, and one represented by Aronson. From the theorizing of Deutsch (1962), it may be posited that when the cooperative situation is based on positive goal interdependence, individuals will act to promote each other's success out of recognition that they will benefit from doing so. When the cooperative situation is based on positive resource interdependence, however, there is mutual dependence on each other's resources, but individuals benefit only from obtaining resources from each other, not from giving their resources to each other. Aronson and his associates (1978) have conducted a set of studies in which they operationalized cooperation through a combination of positive resource interdependence and individual rewards, assuming that positive resource and goal interdependence were interchangeable and non-additive. Their studies, and two major field evaluations by Eric Schaps and his associates (Moskowitz, Malvin, Schaeffer, & Schaps, 1981, 1985), indicate that positive resource interdependence with an individualistic reward structure does not increase achievement beyond what would be expected by a competitive or individualistic reward structure alone.

Theoretically, there are at least two reasons for hypothesizing that resource interdependence will not promote higher achievement than individualistic efforts in the absence of positive outcome interdependence. The first is that, while positive outcome interdependence creates a situation in which each person benefits from the achievement and productivity of fellow group members (and, therefore, exerts efforts to promote their success), resource interdependence creates a situation in

which each person is dependent on receiving resources from other group members but does not gain from sharing his or her resources. When resource interdependence alone exists within a group, each person will be motivated to have others present what they know, but will be penalized by presenting what he or she has learned. Every minute a person presents his or her resources is a minute that he or she is not obtaining needed resources from others.

Second, positive goal interdependence may promote substitutability among the actions of group members, while resource interdependence may not. This may be seen in individuals' reactions to less able group members. Within a cooperative situation characterized by positive goal interdependence, when one member cannot do the work, group members will increase their motivation and effort in order to ensure joint success (because their actions can substitute for the actions of the less capable group member). Within a cooperative situation characterized by resource interdependence, when a member cannot provide his or her part of the required resources, the motivation and effort of the rest of the group members will decrease (because their actions cannot substitute for the actions of the less capable member).

To examine the relative impact of positive goal interdependence and positive resource interdependence on individual achievement and group productivity, Johnson, Johnson, Ortiz, and Stanne (in press) conducted a study directly comparing goal and resource interdependence. Sixty-three individuals enrolled in a U.S. Military History class participated in the study. The study lasted for five class sessions of forty-five minutes each. Achievement was measured by quizzes given at the end of the second, third, and fourth class sessions, and by a final test given at the end of the study. Students were randomly assigned to conditions and within conditions to groups of three. In the goal interdependence condition, individuals studied all the material and were graded on the basis of their total group score. In the resource interdependence condition, individuals were given one-third of the material to learn and teach to the other two mem-

bers of their group, but were graded on their individual performance on the tests. Both on the quizzes and on the final examination, individuals in the goal interdependence condition performed better than did those in the resource interdependence condition.

To examine the relative impact of positive goal interdependence and positive resource interdependence on individual achievement and group productivity, Johnson, Johnson, Stanne, and Garibaldi (1990) conducted a study using a computer-assisted problem-solving task. Forty-four African-American high school seniors and college freshmen were randomly assigned to conditions, stratifying for ability, sex, and urban/rural background. Four conditions were included in the study: (1) both positive goal and resource interdependence, (2) positive goal interdependence only, (3) positive resource interdependence only, and (4) neither positive goal nor resource interdependence (i.e., individualistic). Positive goal interdependence promoted higher individual achievement and group productivity than did an absence of goal interdependence. The combination of positive goal and resource interdependence promoted higher individual achievement and group productivity than did any of the other conditions, indicating that two sources of positive interdependence are more powerful than one. When used in isolation from positive goal interdependence, positive resource interdependence produced the lowest individual achievement and problem-solving success. Students may achieve more under individualistic conditions than under a combination of resource interdependence and individual rewards.

PROMOTIVE (FACE-TO-FACE) INTERACTION

Promotive interaction was defined and discussed in the Interaction Patterns section of this chapter. The amount of research documenting the impact of promotive interaction on achievement is too voluminous to review here. Interested readers are referred to Johnson and Johnson (1989a).

Personal Responsibility/Individual Accountability

After positive interdependence and promotive interaction, a key variable mediating the effectiveness of cooperation is a sense of personal responsibility to the other group members. This involves being responsible for completing one's share of the work and facilitating the work of other group members; in other words, for doing as much as one can toward achieving the group's goals. There are a number of ways in which this personal commitment or responsibility may be inculcated. The first is through structuring positive interdependence among group members so that they will feel responsible for helping each other to achieve the group's goals. The second is through the teacher assessing each individual student's level of achievement, that is, holding each individual student accountable for completing assignments and learning the assigned material.

Students are not only accountable to the teacher in cooperative situations; they are also accountable to their peers. Learning groups should be provided with information about the level of mastery of the assigned material each student is achieving. Feedback mechanisms for determining the level of each person's achievement are necessary for members to provide support and assistance to each other. When groups work on tasks where it is difficult to identify members' contributions or when there is an increased likelihood of redundant efforts, a lack of group cohesiveness, or lessened responsibility for the final outcome, some members will try to contribute less to goal achievement (Harkins & Petty, 1982; Ingham, Levinger, Graves, & Peckham, 1974; Kerr & Bruun, 1981; Latane, Williams, & Harkins, 1979; Moede, 1927; Petty, Harkins, Williams, & Latane, 1977; Williams, 1981; Williams, Harkins, & Latane, 1981). If, however, there is high individual accountability and it is clear how much effort each member is contributing; if redundant efforts are avoided; if every member is responsible for the final outcome; and if the group is cohesive; then the social loafing effect vanishes. The smaller the size of the group; the greater the individual accountability may be.

SOCIAL SKILLS

Placing socially unskilled students in a learning group and simply telling them to cooperate will obviously not be successful. Students must be taught the interpersonal and small-group skills needed for high-quality cooperation and be motivated to use them. Furthermore, all group members must engage in them. If only the most socially skilled group members engage in all the needed leadership and communication skills, they will increase their skills at the expense of less active and less socially skilled group members—the "rich-get-richer" effect.

In their studies on the long-term implementation of cooperation learning, Lew and Mesch (Lew, Mesch, Johnson, & Johnson, 1986a, 1986b; Mesch, Johnson, & Johnson, 1988; Mesch, Lew, Johnson, & Johnson, 1986) investigated the impact of a reward contingency for using social skills, in combination with positive interdependence and a contingency for academic achievement, on performance within cooperative learning groups. In the cooperative skills conditions, students were trained weekly in four social skills, and each member of a cooperative group was given two bonus points toward the quiz grade if all group members were observed by the teacher to demonstrate three out of the four cooperative skills. The results indicated that the combination of positive interdependence, an academic contingency for high performance by all group members, and a social skills contingency, promoted the highest achievement. The more socially skillful students are, and the more attention teachers pay to teaching and rewarding the use of social skills, the higher the achievement that can be expected within cooperative learning groups.

There is only so much that structure can do. Students need to master and use interpersonal and small-group skills to capitalize on the opportunities presented by a cooperative learning situation. Especially when learning groups function on a long-term basis and engage in complex, free exploratory activities over a prolonged basis, the interpersonal and small-group skills of the members may determine the level of student achievement.

GROUP PROCESSING

In order to achieve, students in cooperative learning groups have to work together effectively. Effective group work is influenced by whether or not groups reflect on or process how well they are functioning. A process is an identifiable sequence of events taking place over time, and process goals refer to the sequences of events instrumental in achieving outcome goals. Group processing may be defined as reflecting on a group session to describe what member actions were helpful and unhelpful and make decisions about what actions to continue or change. The purpose of group processing is to clarify and improve the effectiveness of the members in contributing to the collaborative efforts to achieve the group's goals.

No direct evidence of the impact of group processing on achievement was available until a study was conducted by Stuart Yager (Yager, Johnson, & Johnson, 1985). He examined the impact on achievement of (a) cooperative learning in which members discussed how well their group was functioning and how they could improve its effectiveness, (b) cooperative learning without any group processing, and (c) individualistic learning. The results indicate that students at all levels of achievement in the cooperation-with-group-processing condition scored higher on daily achievement, post-instructional achievement, and retention measures than did the students in the other two conditions. Students in the cooperation-without-group-processing condition, furthermore, scored higher on all three measures than did the students in the individualistic condition.

Johnson, Johnson, Stanne, and Garibaldi (1990) conducted a follow-up study comparing (a) cooperative learning with no processing, (b) cooperative learning with teacher processing (the teacher specified cooperative skills to use, observed, and gave whole-class feedback as to how well students were using the skills), (c) cooperative learning with teacher and student processing (in addition to teacher processing, learning groups discussed how well they interacted as a group), and (d) individualistic learning. Forty-nine high-ability African-American high school seniors and entering college

freshmen at Xavier University participated in the study. A complex computer-assisted problem-solving assignment was given to all students. All three cooperative conditions performed higher than did the individualistic condition. The combination of teacher and student processing resulted in greater problem-solving success than did the other cooperative conditions.

These five essential elements—positive interdependence, promotive interaction, personal responsibility, social skills, and group processing—differentiate cooperative learning from traditional discussion groups and well-structured cooperative learning lessons from poorly structured ones. There are three broad types of cooperative learning groups that are structured through the use of the five basic elements.

TYPES OF COOPERATIVE LEARNING GROUPS

A cooperative structure consists of the integrated use of three types of cooperative learning groups. Cooperative learning groups may be used to teach specific content (formal cooperative learning groups), to ensure active cognitive processing of information during direct teaching (informal cooperative learning groups), and to provide students with long-term support and assistance for academic progress (cooperative base groups).

Formal Cooperative Learning Groups

Formal cooperative learning groups may last from one class period to several weeks, working to complete specific tasks and assignments (such as solving a set of problems, completing a curriculum unit, writing a report or theme, conducting an experiment, or reading a story, play, chapter, or book). Any course requirement or assignment may be reformulated to be cooperative. In formal cooperative learning groups the teacher:

- Specifies the objectives for the lesson (one academic and one social skill).
- Makes a series of decisions about how to structure the learning groups (such as what size groups, how students are assigned to groups,

what roles to assign, how to arrange materials, and how to arrange the room).

- Teaches the academic concepts, principles, and strategies that the students are to master and apply, and explains the task to be completed, criteria for success, positive interdependence, individual accountability, and expected student behaviors.
- Monitors the functioning of the learning groups and intervenes to teach collaborative skills and provide assistance in academic learning when it is needed.
- Evaluates student performance against the preset criteria for excellence, and ensures that groups process how effectively members worked together.

Informal Cooperative Learning Groups

Informal cooperative learning groups are temporary, ad-hoc groups that last from a few minutes to one class period. During a lecture, demonstration, or film, they can be used to focus student attention on the material to be learned, help set a mood conducive to learning, and help set expectations as to what will be covered in a class session. They can also ensure that students cognitively process the material being taught and provide closure to an instructional session. During direct teaching, the instructional challenge for the teacher is to ensure that students do the intellectual work of organizing material, explaining it, summarizing it, and integrating it into existing conceptual structures. Informal cooperative learning groups are often organized so that students engage in three-to-five-minute, focused discussions before and after a lecture and three-to-five-minute, turn-to-your-partner discussions interspersed throughout a lecture. In this way the main problem of lectures—"The information passes from the notes of the professor to the notes of the student without passing through the mind of either one"—can be countered.

Cooperative Base Groups

Cooperative base groups are long-term, heterogeneous, cooperative learning groups with stable membership. The purposes of the base group are

to give the support, help, encouragement, and assistance each member needs to make academic progress and develop cognitively and socially in healthy ways. Base groups meet daily (or whenever the class meets). They are permanent (lasting from one to several years) and provide the long-term caring peer relationships necessary to influence members consistently to work hard in school. They formally meet to discuss the academic progress of each member, provide help and assistance to each other, and verify that each member is completing assignments and progressing satisfactorily through the academic program. Base groups may also be responsible for letting absent group members know what went on in class when they miss a session. Informally, members interact every day within and between classes, discussing assignments and helping each other with homework. The use of base groups tends to improve attendance, personalizes the work required and the school experience, and improves the quality and quantity of learning. The larger the class or school and the more complex and difficult the subject matter, the more important it is to have base groups.

When used in combination, formal and informal cooperative groups and base groups provide an overall structure for school learning.

APPROACHES TO COOPERATIVE LEARNING

It is only when we develop others that we permanently succeed.—Harvey S. Firestone, Firestone Tires

Given the strong theoretical and research support for implementing cooperative learning in the classroom it is important to develop operationalizations that teachers can use. Approaches to implementing cooperative learning may be placed on a continuum with conceptual applications at one end and direct applications at the other (Johnson, Johnson, & Holubec, 1984/1990). Conceptual applications are based on an interaction between theory, research, and practice. Teachers are taught a general conceptual model of cooperative learning (based on positive interdependence, face-

to-face interaction, individual accountability, social skills, and group processing—the essential elements approach) which they use to tailor cooperative learning specifically to their circumstances, students, and needs. Teachers are taught an expert system of how to implement cooperative learning that they use to create a unique adaptation to their specific circumstances. The resulting expertise is based on a metacognitive understanding of cooperative learning. The two conceptual approaches to cooperative learning have been developed by Elizabeth Cohen (1986) and the authors of this chapter (Johnson & Johnson, 1975/1991; Johnson, Johnson, & Holubec, 1984/1990). Cohen bases her conceptual principles on expectation-states theory, while we base our conceptual principles on the theory of cooperation and competition that Morton Deutsch derived from Kurt Lewin's field theory. Using the five basic elements of cooperation, faculty can analyze their current curricula, students, and instructional goals and design cooperative learning experiences specifically adapted for their instructional goals and the ages, abilities, and backgrounds of their students. Becoming competent in implementing the basic elements is a requirement for obtaining real expertise in cooperative learning.

Conceptual applications may be contrasted with direct applications that consist of packaged lessons, curricula, and strategies that are used in a prescribed manner. The direct approach can be divided into three subcategories.

- **The strategy approach:** Teachers can adopt a strategy (such as groups-of-four in intermediate math) that is aimed at using cooperative learning in a specific subject area for a certain age student.
- **The curriculum package approach:** They can adopt a curriculum package that is aimed at a specific subject area and grade level.
- **The lesson approach:** They can replicate a lesson they observed another teach. Faculty are trained to use a specific cooperative activity, lesson, strategy, or curriculum package without the necessity of any real understanding of cooperation. Some of the most powerful strategies

include the jigsaw method, developed by Elliot Aronson and his colleagues (Aronson, et al., 1978), the coop/coop strategy developed by Spencer Kagan (Kagan, 1988), and the group project method developed by the Sharans (Sharan & Sharan, 1976).

While the two types of approaches are not contradictory, there are differences for the transfer of training from the workshop to the classroom and for the long-term implementation and survival of cooperative learning. Conceptual applications are theory-based while direct applications are based on materials and procedures. The conceptual approach trains teachers to be engineers who adapt cooperative learning to their specific circumstances and students. Direct approaches train teachers to be technicians who use the cooperative learning curriculum or strategy without necessarily understanding how it works. The conceptual approach promotes research that tests theory which generalizes to many different situations. Direct approaches promote evaluation studies that are, in essence, case studies demonstrating how well the curriculum or strategy was implemented in a specific instance, but the results do not generalize to other situations or implementations. Conceptual approaches are dynamic in that they are changed and modified on the basis of new research and refinements of the theory. Direct approaches are more static in that they tend to remain fixed no matter how the knowledge about cooperative learning changes.

When teachers gain expertise in cooperative learning through conceptual understanding, they can generate new lessons and strategies as the need arises. They can also transfer their use of cooperative learning to create more cooperative collegial relationships, staff meetings, and relationships with parents and committees. Conceptual and direct approaches, however, complement each other. A carefully crafted training program requires a combination of a clear conceptual understanding of the essential elements of cooperative learning and concrete direct examples of lessons, strategies, and continued implementation in classrooms and schools.

THE COOPERATIVE SCHOOL

Take care of each other. Share your energies with the group. No one must feel alone, cut off, for that is when you do not make it.—Willi Unsoeld, mountain climber

For decades business and industrial organizations have functioned as "mass manufacturing" organizations that divided work into small component parts performed by individuals who work separately from and, in many cases, in competition with peers. Personnel were considered to be interchangeable parts in the organizational machine. Such an organizational structure no longer seems effective and many companies are turning to the high productivity generated by teams.

Most schools have also been structured as mass manufacturing organizations. Teachers work alone, in their own room, with their own set of students, and with their own set of curriculum materials. In this situation, students can be assigned to any teacher because teachers are interchangeable parts in the education machine, and, conversely, teachers can be given any student to teach. Schools need to change from a mass-manufacturing or competitive/individualistic organizational structure to a high performance, cooperative, team-based organizational structure (Johnson & Johnson, 1989b). The new organizational structure is generally known as "the cooperative school."

In a cooperative school, students work primarily in cooperative learning groups. Teachers and building staff work in cooperative teams, and district administrators work in cooperative teams. The organizational structure of the classroom, school, and district are then congruent. Each level of cooperative teams supports and enhances the other levels.

A cooperative school structure begins in the classroom with the use of cooperative learning the majority of the time. Cooperative learning is used to increase student achievement, create more positive relationships among students, and generally improve students' psychological well-being. A secondary effect is that using cooperative learning in the classroom affects teachers' attitudes and com-

petencies concerning collaborating with colleagues. Teachers typically cannot promote isolation and competition among students all day and collaborate effectively with colleagues. What is promoted in the instructional situations tends to dominate relationships among staff members.

The second level in creating a cooperative school is to form collegial support groups, task forces, and ad hoc decision-making groups within the school (Johnson & Johnson, 1989b). Just as the heart of the classroom is cooperative learning, the heart of the school is the collegial support group. **Collegial support groups** are small cooperative groups whose purpose is to increase teachers' instructional expertise and success, in particular by using cooperative learning. Participation in the collegial support groups is aimed at increasing teachers' belief that they are engaged in a joint venture ("We are doing it!"); public commitment to peers to increase their instructional expertise ("I will try it!"); peer accountability ("They are counting on me!"); sense of social support ("They will help and assist me!"); sense of safety ("The risk is challenging but not excessive!"); and self-efficacy ("If I exert the effort, I will be successful!"). **Task force groups** plan and implement solutions to schoolwide issues and problems such as curriculum adoptions and lunchroom behavior. Task forces diagnose a problem, gather data about the causes and extent of the problem, consider a variety of alternative solutions, make conclusions, and present a recommendation to the faculty as a whole. **Ad hoc decision-making groups** are used during faculty meetings to involve all staff members in important school decisions. Ad hoc decision-making groups are part of a small-group/large-group procedure in which staff members listen to a recommendation, are assigned to small groups, meet to consider the recommendation, report their decision to the entire faculty, and then participate in a facultywide decision as to what the course of action should be. The use of these three types of faculty cooperative teams tends to increase teacher productivity, morale, and professional self-esteem.

The third level in creating a cooperative school is to implement administrative cooperative teams within the district (Johnson & Johnson, 1989b).

CREATING COOPERATIVE LEARNERS

Administrators are organized into collegial support groups to increase their administrative expertise and success. Administrative task forces and ad hoc decision-making groups are also used. If administrators compete to see who is the best administrator in the district, they are unlikely able to promote cooperation among staff members of the school. The more the district and school personnel work in cooperative teams, the easier it will be for teachers to use cooperative learning and vice versa.

Cooperative learning is more than an instructional procedure. It is a basic shift in organizational structure that extends from the classroom up through the superintendent's office.

SUMMARY

Cooperative learning is the instructional use of small groups so that students work together to maximize their own and each other's learning. The effectiveness of cooperative efforts depends on how well positive interdependence, face-to-face promotive interaction, individual accountability, interpersonal and small group skills, and group processing are structured within the learning situation. These five essential elements may be structured within the learning situation, within the classroom, within the school, and within the school district. In a cooperative school, students work primarily in cooperative learning groups; teachers and building staff work in cooperative teams, as do the district administrators. The heart of the cooperative school is cooperative learning. Cooperative learning

groups may be used to teach specific content (formal cooperative learning groups), to ensure active cognitive processing of information during a lecture (informal cooperative learning groups), and to provide long-term support and assistance for academic progress (cooperative base groups). There are two general approaches to creating cooperative learning procedures, conceptual and direct. Long-term change in teaching practices depends on teachers' understanding conceptually what cooperation is as well as being able to conduct cooperative learning lessons. Within the school, staff members work in collegial support groups to increase teachers' instructional expertise and success. They also form task forces to plan and implement solutions to schoolwide problems and ad hoc decision-making groups to involve all staff members in important school decisions. At the district level administrators are also structured into teams.

Clear theory and abundant and consistent research support a change in school structure from their current competitive-individualistic organizational structure to a cooperative organization. The amount of research validating social interdependence theory and demonstrating the effectiveness of cooperative efforts is staggering. The amount of research demonstrating that cooperative efforts promote greater productivity, more positive relationships, and greater psychological health than do competitive or individualistic efforts places cooperation in a class by itself when considering how to make schools effective.

REFERENCES

- Aronson, E., Blaney, N., Stephan, C., Sikes, J., & Snapp, M. (1978). *The jigsaw classroom*. Beverly Hills, CA: Sage.
- Barker, R., Wright, B., Meyerson, L., & Gonick, M. (1953). *Adjustment to physical handicap and illness: A survey of the social psychology of physique and disability*. New York: Social Science Research Council.
- Cohen, E. (1986). *Designing groupwork: Strategies for the heterogeneous classroom*. New York: Columbia University Teachers College Press.
- Collins, B. (1970). *Social psychology*. Reading, MA: Addison-Wesley.

- Deutsch, M. (1962). Cooperation and trust: Some theoretical notes. In M. R. Jones (Ed.), *Nebraska Symposium on Motivation* (pp. 275-319). Lincoln, NE: University of Nebraska Press.
- Deutsch, M. (1949). A theory of cooperation and competition. *Human Relations*, 2, 129-152.
- DeVries, D., & Edwards, K. (1974). *Cooperation in the classroom: Towards a theory of alternative reward-task classroom structures*. Paper presented at the annual meeting of the American Educational Research Association, Chicago.
- Harkins, S., & Petty, R. (1982). The effects of task difficulty and task uniqueness on social loafing. *Journal of Personality and Social Psychology*, 43, 1214-1229.
- Hayes, L. (1976). The use of group contingencies for behavioral control: A review. *Psychological Bulletin*, 83, 628-648.
- Hill, G. (1982). Group versus individual performance: Are N + 1 heads better than one? *Psychological Bulletin*, 91, 517-539.
- Ingham, A., Levinger, G., Graves, J., & Peckham, V. (1974). The Ringelmann effect: Studies of group size and group performance. *Journal of Personality and Social Psychology*, 10, 371-384.
- Johnson, D. W. (1979). *Educational psychology*. Englewood Cliffs, NJ: Prentice-Hall.
- Johnson, D. W. (1974). Communication and the inducement of cooperative behavior in conflicts: A critical review. *Speech Monographs*, 41, 64-78.
- Johnson, D. W. (1970). *The social psychology of education*. New York: Holt, Rinehart & Winston.
- Johnson, D. W., & Johnson, F. (1991). *Joining together: Group theory and group skills* (4th ed.). Englewood Cliffs, NJ: Prentice-Hall.
- Johnson, D. W., & Johnson, R. T. (1989a). *Leading the cooperative school*. Edina, MN: Interaction Book Company.
- Johnson, D. W., & Johnson, R. T. (1989b). *Cooperation and competition: Theory and research*. Edina, MN: Interaction Book Company.
- Johnson, D. W., & Johnson, R. T. (1979). Conflict in the classroom: Controversy and learning. *Review of Educational Research*, 49, 51-70.
- Johnson, D. W., & Johnson, R. T. (1974). Instructional goal structure: Cooperative, competition, or individualistic. *Review of Educational Research*, 44, 213-240.
- Johnson, D. W., & Johnson, R. T. (1975/1991). *Learning together and alone: Cooperative, competitive, and individualistic learning* (2nd/3rd ed.). Englewood Cliffs, NJ: Prentice-Hall.
- Johnson, D. W., Johnson, R. T., & Holubec, E. (1984/1990). *Circles of learning: Cooperation in the classroom* (2nd/3rd ed.). Edina, MN: Interaction Book Company.
- Johnson, D. W., Johnson, R. T., Ortiz, A., & Stanne, M. (in press). Impact of positive goal and resource interdependence on achievement, interaction, and attitudes. *Journal of General Psychology*.
- Johnson, D. W., Johnson, R. T., Stanne, M., & Garibaldi, A. (1990). Impact of group processing on achievement in cooperative groups. *Journal of Social Psychology*, 130, 507-516.
- Kagan, S. (1988). *Cooperative learning: Resources for teachers*. San Juan Capistrano, CA: Resources for Teachers.
- Kerr, N. (1983). The dispensability of member effort and group motivation losses: Free-rider effects. *Journal of Personality and Social Psychology*, 44, 78-94.
- Kerr, N., & Bruun, S. (1981). Ringelmann revisited: Alternative explanations for the social loafing effect. *Personality and Social Psychology Bulletin*, 7, 224-231.
- Lamm, H., & Trommsdorf, G. (1973). Group versus individual performance on tasks requiring ideational proficiency (brainstorming): A review. *European Journal of Social Psychology*, 3, 886-893.
- Langer, E., & Benevento, A. (1978). Self-induced dependence. *Journal of Personality and Social Psychology*, 36, 886-893.
- Latane, B., Williams, K., & Harkins, S. (1979). Many hands make light the work: The causes and consequences of social loafing. *Journal of Personality and Social Psychology*, 37, 822-832.
- Lew, M., Mesch, D., Johnson, D. W., & Johnson, R. T. (1986a). Positive interdependence, academic and collaborative-skills group contingencies and isolated students. *American Educational Research Journal*, 23, 476-488.

CREATING COOPERATIVE LEARNERS

- Lew, M., Mesch, D., Johnson, D. W., & Johnson, R. T. (1986b). Components of cooperative learning: Effects of collaborative skills and academic group contingencies on achievement and mainstreaming. *Contemporary Educational Psychology, 11*, 229-239.
- Lewin, K. (1948). *Resolving social conflicts*. New York: Harper.
- Lewin, K. (1935). *A dynamic theory of personality*. New York: McGraw-Hill.
- May, M., & Doob, L. (1937). Competition and cooperation [Special issue]. *Social Sciences Research Council Bulletin, 25*, New York: Social Sciences Research Council.
- Mayer, A. (1903). Über einzel-und-gesamtleistung des schulkindes. *Archiv für die Gesamte Psychologie, 1*, 276-416.
- Mesch, D., Johnson, D. W., & Johnson, R. T. (1988). Impact of positive interdependence and academic group contingencies on achievement. *Journal of Social Psychology, 128*, 345-352.
- Mesch, D., Lew, M., Johnson, D. W., & Johnson, R. T. (1986). Isolated teenagers, cooperative learning and the training of social skills. *Journal of Psychology, 120*, 323-334.
- Moede, W. (1927). Die richtlinien der leistungspsychologie. *Industrielle Psychotechnik, 4*, 193-207.
- Moskowitz, J., Malvin, J., Schaeffer, G., & Schaps, E. (1985). Evaluation of jigsaw, a cooperative learning technique. *Contemporary Educational Psychology, 10*, 104-112.
- Moskowitz, J., Malvin, J., Schaeffer, G., & Schaps, E. (1981). Process and outcome evaluation of a cooperative learning strategy. *American Journal of Educational Research, 20*, 687-696.
- Petty, R., Harkins, S., Williams, K., & Latane, B. (1977). The effects of group size on cognitive effort and evaluation. *Personality and Social Psychology Bulletin, 3*, 575-578.
- Salomon, G. (1981). Communication and education: Social and psychological interactions. *People and Communication, 13*, 269-271.
- Sharan, S., & Sharan, Y. (1976). *Small group teaching*. Englewood Cliffs, NJ: Educational Technology Publications.
- Sheingold, K., Hawkins, J., & Char, C. (1984). I'm the thinkist, you're the typist: The interaction of technology and the social life of classrooms. *Journal of Social Issues, 40*(3), 49-61.
- Slavin, R. (1983). *Cooperative learning*. New York: Longman.
- Slavin, R. (1980). Cooperative learning. *Review of Educational Research, 50*, 315-342.
- Slavin, R., Leavey, M., & Madden, N. (1982). *Team-assisted individualization: Mathematics teacher's manual*. Baltimore: John Hopkins University, Center for Social Organization of Schools.
- Sweeney, J. (1973). An experimental investigation of the free-rider problem. *Social Science Research, 2*, 277-292.
- Thomas, D. (1957). Effects of facilitative role interdependence on group functioning. *Human Relations, 10*, 347-366.
- Triplett, N. (1898). The dynamogenic factors in pace-making and competition. *American Journal of Psychology, 9*, 507-533.
- Watson, G., & Johnson, D. (1972). *Social psychology: Issues and insights*. Philadelphia: Lippincott.
- Webb, N., Ender, P., & Lewis, S. (1986). Problem-solving strategies and group processes in small group learning computer programming. *American Educational Research Journal, 23*(2), 243-261.
- Williams, K. (1981). *The effects of group cohesiveness on social loafing*. Paper presented at the annual meeting of the Midwestern Psychological Association, Detroit.
- Williams, K., Harkins, S., & Latane, B. (1981). Identifiability as a deterrent to social loafing: Two cheering experiments. *Journal of Personality and Social Psychology, 40*, 303-311.
- Yager, S., Johnson, D., & Johnson, R. (1985). Oral discussion, group-to-individual transfer, and achievement in cooperative learning groups. *Journal of Educational Psychology, 77*(1), 60-66.

BUILDING A RESEARCH SYNTHESIS

James Bellanca and Robin Fogarty

Any naysayer who says that cooperative learning is just a fad or another new wrinkle may find the following bit of history interesting. In the earliest settlements, the pioneer families knew the benefits of tutoring their children in groups. Very often, older students paired with the younger to "cipher the slates," read stories, and review their Bible lessons. In the pioneer schools, several families bunched their children into one room. The young teacher, very often one of the oldest students, relied heavily on the children to help each other with lessons. Well into the twentieth century in rural America, the one-room schoolhouse—with cross-age tutors, cooperative learning groups, and group investigations—was the norm. Not until the urban school emerged and the modern factory arrived did schools adopt the assembly line model of teaching and learning. Even at that time, educational leaders such as Francis Parker, superintendent of Quincy Public School (1875-80), John Dewey, Carlton Washborne, and Martin Deutsch were strong advocates of the cooperative learning model. As early as 1897, Triplett was conducting the first formal studies. Today, thanks to the work of Johnson and Johnson, Slavin, and others, nu-

merous studies document the powerful effects of cooperative learning as well as the specific elements needed to make cooperation work in the classroom. No other instructional method used today can claim the quantity or quality of research highlighting its success.

In the 1970s, two major school issues gave birth to a concentrated focus on cooperative learning. The first was the mainstreaming issue; the second was the integration challenge. When Public Law 94-142 was passed by Congress in the 1970s, schools had to restructure classrooms to include the handicapped. Many students previously separated from regular classroom life were mainstreamed. Regular teachers, not knowing how to deal with students who had physical disabilities or learning or behavioral problems were concerned. The first concern focused on how the "regular" and the "special" students would get along. Many of the mainstreamed students lacked social skills and could easily antagonize their peers; many regular students, who were equally lacking in these social skills, estranged their new classmates.

Following the integration directions established by the Supreme Court in *Brown vs. the Board of Education*, 1954, schools across the nation were

challenged to restructure student assignment patterns. "Separate but equal" schools were out. As students from different racial groups were mixed into unsegregated schools and classrooms, the concerns focused on how these young people would get along.

Roger and David Johnson, two brothers at the University of Minnesota, proposed a solution that applied to both challenges—direct instruction of social skills with guided classroom practice. They theorized that students who were taught to work cooperatively in small groups would develop positive social skills. This in turn, they speculated, would speed the integration of students who saw each other as different.

To everyone's pleasant surprise, the data gathered in these early programs not only showed that their methods worked as planned for improving student-to-student interaction, but also had two unpredicted side effects—dramatic increases in the academic achievement of students and improvement in students' self-esteem.

From these early studies sprang more than five hundred studies by Johnson and Johnson and other researchers. Over and over, with a consistency and reliability remarkable for a school methodology, the studies have demonstrated how and why cooperative learning is one of the most powerful teaching and learning tools available. In a research article on the various models of teaching, Joyce, Showers, and Rolheiser-Bennett (1987) wrote: "Research on cooperative learning is overwhelmingly positive, and the cooperative approaches are appropriate for all curriculum areas. The more complex the outcomes (higher-order processing of information, problem solving, social skills, and attitudes), the greater are the effects."

No instructional tool has held researchers' attention more than the cooperative model has. Johnson and Johnson, perhaps the most prolific researchers of cooperative learning, claim we know more about cooperative learning than any other instructional methodology. They further point out that the results of the research on cooperative learning hold true regardless of factors such as age, subject matter, race, nationality, and sex.

THE MAJOR FINDINGS

- Students who learn in the cooperative model perform better academically than students who learn in the individualistic or competitive models. Johnson et al.'s 1981 meta-analysis of 122 studies shows that cooperative learning tended to give higher achievement results than the other two methods, especially with such higher-level tasks as problem solving, concept attainment, and prediction. Further studies indicate why this superior success occurs.
- Because of the amount of "cognitive rehearsal," all students at all ability levels in cooperative learning groups enhance their short- and long-term memory as well as their critical thinking skills (Johnson and Johnson, 1983).
- Because cooperative experiences promote positive self-acceptance, students improve their learning, self-esteem, liking for school, and motivation to participate (Johnson and Johnson, 1983).
- Because cooperative learning leads to positive interaction between students, intrinsic learning motivation and emotional involvement in learning are developed to a high degree (Johnson and Johnson, 1989).
- Because cooperative learning nurtures positive peer relationships and structures positive interactions, students in cooperative learning classrooms develop stronger scholastic aspirations, more positive social behavior, and more positive peer relationships (Johnson, 1979).

There are a variety of successful approaches to cooperative learning. Although it is clear to the researchers that classrooms organized for cooperative learning produce superior academic, social, and personal results, they do debate which is the "best" approach—at least as measured by research standards. Because few practitioners have the luxury of isolating classroom practice to the "purity" desired by the researchers, most classroom teachers adopt a single approach or a combination of approaches that works best with their own teach-

COOPERATIVE LEARNING: FIVE MODELS				
MODEL	CREATOR	DESCRIPTION	PLUSES	MINUSES
CONCEPTUAL APPROACH	Johnson & Johnson Cohen	Theories of cooperation, competition, and expectation-state theory	+ creative teachers create + can easily enhance what experienced teacher already does	- time away from content - no recipes - extra planning time - not step-by-step - unskilled teachers - full commitment
CURRICULUM PACKAGES APPROACH	Slavin	Curriculum packages that have cooperative learning structured into the materials	+ easy to train + daily + pretested strategies + instructional variety + basic skills	- no direct teaching of social skill - discourages transfer - not a lot of curriculum packages available
STRUCTURES APPROACH	Kagan	A repertoire of interactive strategies	+ simplicity in structures + easy to use + builds repertoire of strategies	- cutesy - assumes transfer if restricted to low-level tasks
GROUP INVESTIGATION MODEL	Sharan & Sharan	The ultimate classroom jigsaw	+ inquiry + social skills + creative problem solving + facilitates skills + gives depth to content	- not good for curriculum coverage - if students have poor social skills - if parents want same assignment for all
COGNITIVE APPROACH	Bellanca & Fogarty	A synthesis of the four cooperative learning approaches with higher-order thinking focus	+ synthesis + creative application + transfer + blend graphic organizers + macro-thinking processes	- needs training - needs commitment from school & district

Figure 1 Cooperative Learning: Five Models

ing style and their students. Ironically, the research on staff development tells us that the most effective practitioners are more likely to pull the best from each approach and create their own approaches.

THE FIVE APPROACHES

A brief look at the major approaches will help teachers clarify the pluses and minuses of each and understand the tremendous wealth of successful cooperative tools that have been developed (see Figure 1).

Model One: The Conceptual Approach

Roger Johnson, a science educator, and his brother, David Johnson, a social psychology researcher, use their early studies of cooperative learning to frame the conceptual approach. The Johnsons argue that all effective cooperative learning is marked by five critical characteristics. If all five characteristics are present, there is cooperative learning; however, if any one attribute is missing, there may be group work, but not cooperative learning.

Johnson's Five Elements of Cooperative Groups

1. *Face-to-Face Interaction.* The physical arrangement of students in small, heterogeneous groups encourages students to help, share, and support each other's learning.
2. *Individual Accountability.* Each student is responsible for the success and collaboration of the group and for mastering the assigned task.
3. *Cooperative Social Skills.* Students are taught, coached, and monitored in the use of cooperative social skills, which enhance the group work.
4. *Positive Interdependence.* A structure that includes a common goal, group rewards, and role assignments is used to encourage students to assist each other in completing the learning task.
5. *Group Processing.* Students reflect on how well they work as a group to complete the task and how they can improve their teamwork.

In any cooperative lesson, these characteristics overlap. They are identified to reinforce the notion that all groups are not cooperative groups. As mental "coat hooks," the characteristics provide a framework for designing strong and effective cooperative learning tasks. They also provide an umbrella under which a large variety of cooperative strategies, structures, and activities may be gathered. As the teacher designs a cooperative lesson, these characteristics are the checklist to ensure the greatest success.

Pluses and Minuses For teachers who dislike recipe and workbook teaching, the conceptual model is a delight. In effect, the Johnsons' research acts as a touchstone against which the experienced teacher can measure what he or she already does with groups and make quick, positive adjustments that result in greater student-to-student teamwork. For the teacher who has never used groups, the approach provides standards that point out some sure ways to start. The Johnsons recognize—as do adult learning researchers such as Fullan, Knowles, and Krupp—that a teacher is most likely to add to a repertoire of skills and strategies when there are street lights to guide the progress.

There are several minuses to the conceptual model. First, it requires extra time for planning lessons. Even when used only as guided lesson practice, this approach requires time to restructure lesson plans. When the teacher is taking a bolder step to prepare an inquiry or group investigation, even more time is needed.

Second, the conceptual approach doesn't work well for teachers who want a workbook, ditto masters for step-by-step procedure manuals, absolute quiet, or straight rows of desks. This approach requires a teacher who is most comfortable creating lessons in and around required concepts and skills. The teacher who cannot tolerate ambiguity and the chance that a lesson might go flat without a step-by-step procedure manual, workbooks, or blackline masters shouldn't start here.

Third, the conceptual model may end up as poison for the bright child. When a teacher restricts most of the cooperative learning to low-level recall tasks (vocabulary review, computational practice, etc.), the gifted child never gets the chance to soar. Instead, he or she ends up as a substitute teacher, doing work for the other children, never reaping any of the social or intellectual benefits.

Fourth, the conceptual model requires a full commitment to learning and transfer. The teacher needs time to learn the model, to develop the skills, strategies, and structures and to redesign the classroom. As Bruce Joyce has pointed out, this instructional change process requires not only well-taught demonstrations, but also a solid peer coaching program and administrative support for implementing the changes.

Fifth, because there is no prepared day-to-day cooperative learning curriculum, the conceptual model sometimes is used only as a filler for "What do we do on Friday afternoons?" and "Let's play a cooperative game."

Finally, the conceptual approach bumps against the "coverage" curriculum. It takes more time in the crowded day to teach lessons in the conceptual model of cooperative learning. Where does the social skill instruction fit in? Where is the time for group processing? The conceptual approach demands time away from content coverage to ensure successful learning by all students.

Model Two: The Curriculum Approach

Slavin's research (1980), conducted with colleagues at the Johns Hopkins University Center for Research on Elementary and Middle Schools, focuses on cooperative learning and basic skill instruction. Slavin and his colleagues have developed a series of cooperative curriculum programs in math and language arts. They have prescribed specific cooperative strategies that teachers can easily learn as they promote heterogeneous cooperation. Because they desire workable alternatives to tracking and ability grouping practices, especially where those practices are detrimental to poor and minority children, they stress packages that all teachers can easily use. Slavin's curriculum packages include:

- Team Accelerated Instruction (TAI)
- Cooperative Integrated Reading and Composition (CIRC)
- Teams, Games, Tournaments (TGT)
- Student Teams, Achievement Division (STAD)

Team Accelerated Instruction (TAI) is a mathematics program that combines cooperative learning with individualized instruction in a heterogeneous classroom. Designed for grades three to six, TAI utilizes the students to tutor each other, to encourage accurate work, to produce positive social effects, and to handle the record-keeping logistics of individualized instruction or program-med learning. Every eight weeks, teams of high, middle, and low achievers take achievement tests for placement in the individualized program. In the teams, students help each other through the material. Each day, the teacher pulls students from the heterogeneous groups for focused instruction. Students work in teams and across teams to progress through the material. Each week, progress scores are established for each team. Criteria are established in advance for the degrees of recognition each team receives.

TAI is most notable for dispelling the myth that math instruction must be done by track or ability group. One look at the results clearly shows how TAI students of all abilities do better at computation in concepts and at applications with supportive

effects in math self-concept, math liking, behavior, relations, and acceptance of differences (Slavin, 1980).

Cooperative Integrated Reading and Composition (CIRC). In preparing a cooperative curriculum for language arts, grades three and four, Slavin's group used cooperative methods for reading groups (eight to fifteen students) and reading teams (two or three students). As students work in their teams, they earn points for their groups. Points based on scores from quizzes, essays, and book reports allow students to earn certificates. As some teams use a variety of strategies, the teacher monitors progress or instructs other teams in comprehension strategies (e.g., predicting, comparing, drawing conclusions). Included in the strategies are partner reading, story prediction, words-aloud practice, spelling review, partner checking, and team comprehension games. At times, students work individually doing independent reading, basal work, or book reports.

CIRC research results are most notable for showing the benefits of cooperative learning with mainstreamed handicapped students, without detriment to the highest-performing students. In the studies, high, medium, and low performers showed equal gains, although the mainstreamed handicapped gains were most impressive.

Teams, Games, Tournaments (TGT) This may be the most widely known of Slavin's curricular approaches and is adaptable to any curricular area, K-12. In this format, students work in groups to master content provided by the teacher. After practicing on worksheets, students demonstrate mastery of the content in weekly tournaments. Students compete in teams against other teams of equal ability (e.g., top achievers vs. top achievers).

STAD (Student Teams, Achievement Division). STAD was designed by Slavin and the Johns Hopkins Group in 1982. In these heterogeneous groups, four or five students of mixed ability, ethnicity, and gender work on worksheets that already have the answers provided. The common goal is to understand the answers, not fill in the blanks. The teams quiz each other until all members understand the answers. The task is completed when the teacher gives an individual quiz to each

member. The team score is the sum of the improvement points earned by each individual. Special recognition is given to the teams with the greatest improvement.

Pluses and Minuses There are seven pluses for the curriculum approach to cooperative learning: (1) It is easy to train teachers. The lessons and strategies are preset for a beginning level training program and show how to use the set curriculum. (2) The approach builds in daily cooperative learning that needs little pre-planning on the teacher's part. By setting out daily lessons, there is higher probability that they will be used. (3) The strategies are pretested as appropriate to each content. The teacher can worry less about "doing the right thing." (4) The curriculum has built-in instructional variety. Small-group, large-group, and individual activities are balanced with direct instruction by the teacher. (5) The programs take a higher-order thinking approach to direct instruction and guided practice of content. (6) Most of the critical attributes of cooperative learning outlined by the Johnsons are inherent within each curriculum. And, (7) it gets results in self-esteem as well as academic achievement.

The minuses most frequently discussed regarding the curriculum approach center on social skill instruction. In the model, social skills are developed indirectly. There is no room given for direct instruction to students on how to work cooperatively. While the approach works very well with skilled classroom managers and with students who are well-behaved, many teachers report that it breaks down when competition (as in TGT or CIRC) between groups becomes too intense, the teacher lacks strong management skills, or the students have little experience or valuing of cooperative learning.

The second minus derives from the first curriculum thrust. The detailed, step-by-step procedure for implementing cooperative learning within a set curriculum discourages transfer of the approach to other curricular areas. For instance, if the teacher is using CIRC for math, he or she may not see any way to use cooperative learning elements in reading social studies.

The third minus is the very small number of developed cooperative curricula available for the classroom. Although some major educational publishers are suggesting some cooperative activities within science and language arts texts, the scope of well-developed cooperative curricula is limited.

Model Three: The Structural Approach

Since 1967, Spencer Kagan has focused his research on the structural approach to cooperative learning. This approach is based on the creation, analysis, and application of content-free structures that cause students to interact in positive ways in the classrooms. Content-free structures, usable with any content, enable the teacher to make multiple applications of a single structure in a variety of subjects. (The debate about content-free structures and content-specific structures is heard, it seems, whenever skill theorists get together. Their debates on study skills, thinking skills, social skills, and reading skills have very similar dialogues. While there is clear evidence that both content-free and content-specific structures produce positive effects, there is little proof that one method is superior to the other.)

Kagan's structures fall into three groups:

- *In Turn.* The teacher structures a task in which individuals take a turn in a prescribed order. Included among these are "round robin" or "response in turn," "round table," "four corners," and "three-step interview."
- *Jigsaw.* The teacher structures the task so that each student in the group has part of the information to study. When all members teach each other their material, the whole is greater than the parts. "Level I jigsaw," "level II jigsaw," "co-op—co-op," and "think-pair-share" all follow this format.
- *Match-Ups.* The teacher structures student-to-student tasks, which formally and informally create cooperative situations. Included here are "match mine," "numbered heads together," "co-op cards" and "partners."

Pluses and Minuses The pluses and minuses of the structural approach begin with its simplicity. Each structure is easy to use. This means it takes

less than a staff development hour to master a single structure and to develop a variety of appropriate activities. The new structures blend quickly with lecture format and provide practical ways to develop "quick," informal student interactions and well-structured discussions.

Just as teachers easily switch to cooperative structures from more traditional classroom methods, students also easily adapt to the new methods. Because of the number of structure options, a teacher can introduce more variety into the daily regimen and thus boost motivation.

As the teacher builds a more extensive repertoire of cooperative structures, it is possible to find a number of ways to create multi-dimensional lessons. For example:

Anticipatory Set: The teacher calls a student to the front of the class and interviews the student. "Who are you? What is your age? Where were you born? When did you start school here? Why do you think I am asking you these questions?" The answer to the why question would be to model an interview that uses the basic five questions of who, what, when, where, and why.

Objective: The teacher shows the lesson objective on the overhead: "To develop interview questions in preparation for a news article."

Input: The teacher shows the newspaper model on the overhead, explains the key questions, and demonstrates how the parts of the graphic are used. She or he uses the questions asked in the anticipatory set to demonstrate.

Checking for Understanding: The teacher tells the students to turn to a neighbor. Next, one student in each pair explains to the partner how to use the newspaper model to generate the questions. After three minutes, the groups stop. Several different listeners from the pairs describe what they heard. Other students give corrective feedback as needed.

Guided Practice: The teacher distributes one copy of the model to each pair. A recorder and a checker are assigned. The pairs review

roles and cooperative guidelines as the teacher monitors and assists the pairs as needed. After this round, several pairs describe the questions they asked and explain why they made each selection. Again, corrective feedback is encouraged. A second round of models is given out for additional practice.

Unguided Practice: For homework, all students are given a sheet of instructions for interviewing a household member of their choice.

Closure: On the next day, each pair joins a second pair and they review and critique each other's interview questions. This is followed by an all-class discussion about interview questions. Which questions are most important? Why? What benefits the writer?

Another plus is that the structures readily lend themselves to problem solving and the application of thinking tasks. For example, partner structures can work at any level of thinking (see Figure 2).

The simplicity of the structural approach is a double-edged sword. Because the structures look "fun and cute," a teacher may save the structures for Friday afternoon fillers. Consequently, the students get the message that these are play activities, and they reap little value from the potential richness of the cooperative structure.

The second minus is that the structural approach assumes a great deal about student transfer of the cooperative ethic, cooperative skills, and cooperative behaviors. Much is left to the teacher's enthusiasm, assertiveness, and ability to design a variety of lessons for each content area—that is, if the teacher's classroom management skills and enthusiasm are to hook students into cooperative tasks. However, because the structural approach works best as a hook, the cooperative skills are transferred more by osmosis than by formal instruction. As with the curriculum approach, the lack of formal group processing and social-skill instruction limits the transfer of cooperative skills beyond the specific task to the super learners.

The third minus of the structural approach occurs when the teacher restricts the use of cooper-

THREE THINKING LEVELS

Thinking Level I: Gathering Information

1. Assign each pair in a team a list of vocabulary words. Have the pairs coach and quiz each other on the meanings of assigned words. If any pair is unsure of a definition, have it check with another pair for advice.
2. When all pairs are ready, have a final check for mastery in each team. Follow this with a quiz in which teams compete against each other.

Thinking Level II: Processing Information

1. Have each pair use the vocabulary words to create a story about the current season of the year. If any pair gets stuck, let it "travel" for help to another pair.
2. Have each pair share its story with the team. Encourage the team to explain why each story was done well.

Thinking Level III: Applying Information

1. Have each pair hypothesize changes that might occur to the current season of the year if global warming increases in the next decade.
2. Have pairs share their hypotheses in a team. Assign one person in a team to list the hypotheses on a sheet of newsprint. Encourage the teams to discuss and rank their hypotheses based on which effect would be most disastrous.

Figure 2 Three Thinking Levels

SHARAN AND SHARAN'S GROUP INVESTIGATION MODEL

Stage One: Posing the Big Question and Forming Groups by Interest. The teacher frames the broad topic, which the students investigate as a "big" question.

- What do you think will happen if the U.S. produces twice as much nuclear waste per year each year for the next decade?
- How would American society be different today if we had lost World War II?
- What can we learn from a study of plant life?

After the big question, students are encouraged to brainstorm what they want to know about the topic. If they need stimulation, the teacher provides a potpourri of print or video materials, a guest lecturer or a field trip. Generated questions are reviewed in teams, and then classified and synthesized into subtopics for small-group investigation.

Stage Two: Identifying the Inquiry Problem and Planning How to Research. Each student selects a subtopic to investigate. The subtopic teams formulate the problem statement and help each other discuss and plan the search process.

Stage Three: Dividing Up the Work and Gathering Information. The groups divide up the research. Members research their information, analyze it, and draw initial conclusions.

Stage Four: Preparing the Report. The groups translate their results into a class report. The teacher schedules the reports.

Stage Five: Presenting and Evaluating the Report. As the groups make formal presentations, the teacher guides discussions on their results. Finally, students evaluate their work.

Figure 3 Sharan and Sharan's Group Investigation Model

ative structures to low-level and routine classroom tasks (spelling words, worksheets, computation drill and practice, etc.). Students quickly perceive such limited use as a gambit to manipulate quick interest.

Model Four: The Group Investigation Approach

One classroom teacher who used both the conceptual approach and the structural approach called group investigation the "ultimate jigsaw." "For my classes," she says, "group investigation is the most powerful and empowering of the cooperative methods." In group investigation, students work together to plan how they will find answers to key questions about a topic of mutual interest. The group breaks the work down into individual or pair investigation tasks. Each person gathers the assigned information and brings it to the group for discussion, synthesis, and reporting to the class. The teacher plays the major facilitating role through each stage of this inquiry process (see Figure 3).

Pluses and Minuses If the teacher wants the optimum structure for encouraging inquiry, student-to-student interaction, cooperative social-skill development, creative problem solving, and communication skills, this approach provides it. If the teacher wants the maximum opportunity to use his or her facilitation skills with students, group investigation provides it. If the teacher wants students to delve deeply into a concept in the curriculum, then he or she will find no better motivator.

On the other hand, if the teacher is concerned about curriculum coverage or a supervisor who expects quiet students seated in rows or needs to know what each student is doing every moment, then group investigation will not work. If students are not well prepared for positive interaction, question asking, problem solving, and consensus seeking, or if they cannot handle the open-ended tasks, the group investigation will fall flat. And if parents expect uniform assignments, daily quizzes, and grades, grades, grades, don't even think about group investigation. In short, the minuses of this approach focus on lack of order and recall; its pluses focus on abundant cognitive rehearsal.

Model Five: The Cognitive Approach

A study of these various approaches shows that no one approach is sufficient or superior. Cooperative learning in some form is a necessary tool for use in every effective classroom. It serves the practical teacher to use a design that borrows the best from each approach and builds a foundation for thoughtfulness.

As we have listened and worked with teachers in their classrooms, it has become more and more clear that a synthesized model that ties cooperative learning with a critical and creative thinking context of learning for transfer is needed. We look at cooperative learning as an essential ingredient for developing students who are better able to think critically and creatively. We sometimes sketch the picture of cooperative learning as a jet engine with critical and creative thinking skills being the fuel. When put together, they produce the power needed for soaring to new frontiers of discovery and adventure.

The Essential Concepts Plus One The Johnson and Johnson model outlines the five essential ingredients that distinguish cooperative learning from other forms of group work and which are necessary for making cooperative learning succeed in the classroom. When combined with cognitive processing (lessons focus on higher-order thinking tasks) the additional element of thinking for transfer is also added. And when each and every lesson is structured from this transfer perspective, even more dynamic changes occur in the classroom.

What the Kagan model calls cooperative structures, trainers in other fields, such as Blanchard et al. (business training and development); Canfield and Wells (self-esteem); Rath (values clarification); and Goodman (creative problem solving) have called strategies. Whichever name is used, the common element is that the strategies approach to staff development encourages the quickest transfer and use without falling into the workbook mentality. In Bellanca and Fogarty's cognitive model, an inductive approach is used. First, teacher trainees begin with basic strategies that are easy to apply and use. This is the practical element. The integrated staff development program begins with participants working together to plan how to weave these

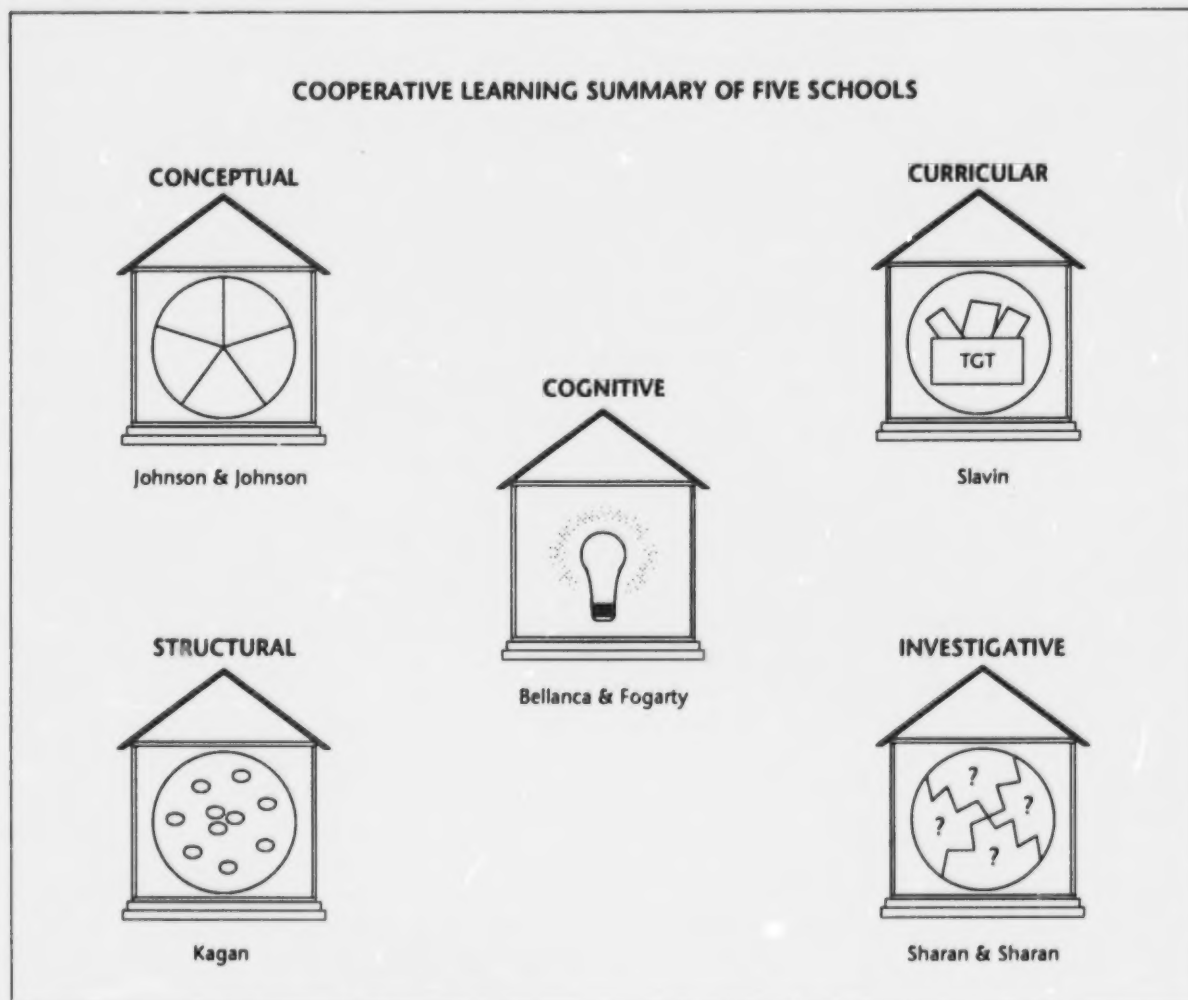


Figure 4 Five Schools of Cooperative Learning

basic strategies into the classroom. After the trainees have experienced strategies both as students and as teachers, they explore the conceptual framework; the concepts prevent the strategies from being isolated games. Later, in an advanced program, after intensive classroom application, the trainees focus on the more sophisticated strategies. These require students with higher-level social skills and concentration on inert cognition, problem solving, and reasoning in a variety of contents (e.g., math reasoning, language arts, science). In the final stage, trainees concentrate on two leaders for mentor coaching and curriculum renewal. Both extend the use of cooperative learning and cogni-

tive instruction to teamwork and problem solving as key components for effective transfer.

Pluses and Minuses The cognitive model asks for a long-term and intense commitment to staff development. Moreover, it expects that what happens in the training program, as well as what happens in the classroom, will be used. With this synthesis, teachers can begin switching from a focus on recall and quick-answer tests to a focus on transferring knowledge and skills across the curriculum, and into life outside the school walls.

This model takes time. In an already crowded curriculum, with more and more coverage being required, where is the time for group processing,

metacognition, or social skills? To do these functions well, content coverage must give way.

The teacher who uses this model needs a high tolerance for ambiguity. If the classroom is a world of one right answer, the first precondition for developing intelligent behaviors and social skills is lacking. In this model, greater emphasis is placed on helping youngsters process and apply information than on having students memorize great quantities of detailed information. The teacher most often is asked to challenge and extend thinking and less often to inoculate students with information.

Teachers using the cognitive model also need strong planning skills and a creative beat. There is no page-by-page recipe or lock-step teacher's guide. Teachers must feel comfortable with their own ability to design lessons that incorporate not only cooperative learning, but also intelligent behavior and reasoning skills.

This model requires intense and supportive staff development for most implementors. This means the district will need to spend money not only for intensive training days, but also for coaching teams, administrative inservice, and opportunities to restructure curriculum.

The cognitive model is difficult to test with standardized instruments. This is especially true when trying to measure students' transfer of concepts, their ability to reason, and their acquisition of knowledge. To succeed, assessments other than scantron tests are needed. The cognitive model asks students to strive for intelligent behavior, not test results. This is well outside the norms imposed by the current interest in quick tests of isolated facts and skills.

The cognitive model will push a school on essential curricular change. Thinking and cooperating require more time for in-depth exploration of concepts and practice of skills and an emphasis on inquiry rather than answers. When the coverage of curriculum is the norm and isolated facts are king, there is no time for quality thinking or intense cooperation. Unless the school district is ready to challenge the restrictive time limits and coverage of materials, and unless it is ready to redesign curricula with transfer in mind, teachers can expect students to have a more difficult time with transfer.

The cognitive model does not necessitate total curricular changeover. But it does facilitate change by encouraging teachers to set new priorities in their curricula—i.e., "What are the most important concepts to establish firmly, and what are the facts to cover more quickly?"

It also encourages teachers to think about thinking skills as tools for unifying and integrating their curriculum. For instance, they can teach prediction in depth with language arts lessons and use science, math, and social studies materials for students to practice thinking skills in cooperative groups.

In effect, the combination of cooperative learning and cognitive development is not just equal to a math computation in addition (cooperation plus thinking is not the same as $3+3=6$), but rather a multiplication of components ($3 \times 3=9$) in the classroom. Add still another factor, a transfer-based staff-development program with structured coaching and support, and a powerful, exponential change process that produces effective, multi-dimensional results ($3 \times 3 \times 3=27$) is engaged.

REFERENCES

- Bellanca, J., & Fogarty, R. (1991). *Blueprints for thinking in the cooperative classroom*. Palatine, IL: Skylight Publishing.
- Canfield, J., & Wells, H. (1976). *100 ways to enhance self-concept in the classroom: A handbook for teachers and parents*. Englewood Cliffs, NJ: Prentice-Hall.
- Deutsch, M. (1949). An experimental study of the effects of cooperation and competition upon group processes. *Human Relations*, 2, 199-232.
- Fullan, M. (1982). *The meaning of educational change*. New York: Teachers College Press.

CREATING COOPERATIVE LEARNERS

- Johnson, D. W. (1979). *Educational psychology*. Englewood Cliffs, NJ: Prentice-Hall.
- Johnson, D. W., & Johnson, R. (1989). *Cooperation and competition: Theory and research*. Edina, MN: Interaction Book Company.
- Johnson, D. W., & Johnson, R. (1983). The socialization and achievement crises: Are cooperative learning experiences the solution? In L. Bickman (Ed.), *Applied social psychology annual 4*. Beverly Hills, CA: Sage Publications.
- Johnson, D. W., Maruyama, G., Johnson, R., Nelson, D., & Skon, L. (1981). Effects of cooperative, competitive, and individualistic goal structures on achievement: A meta-analysis. *Psychological Bulletin*, 89, 47-62.
- Joyce, B., Showers, B., Rolheiser-Bennett, C. (1987). Staff development and student learning: A synthesis of research on models of teaching. *Educational Leadership*, 45(2).
- Slavin, R. E. (1980). *Using student team learning*. Baltimore, MD: Center for Social Organization of Schools, Johns Hopkins University.
- Slavin, R., Leavey, M., & Madden, N. (1982). *Team-assisted individualization: Mathematics teacher's manual*. Baltimore: Johns Hopkins University, Center for Social Organization of Schools.
- Triplett, N. (1897). The dynamic factors in pacemaking and competition. *American Journal of Psychology*, 9, 507-533.

BUILDING A CARING, COOPERATIVE CLASSROOM

James Bellanca

"A cooperative classroom? Students who respect and care for each other? My students only know how to put each other down."

"Teach students how to cooperate? Are you kidding? I don't have time to do everything else as it is. I've got test scores to raise."

"Social skills? Aren't they the job of the parents?"

"Come on now. You have to be kidding. What else do you want to add to the curriculum. Isn't it already an overstuffed sausage?"

"Isn't the school responsible for too much already? Why should we have to teach the social skills too?"

"These are just little children. Isn't this premature?"

Such are the legitimate questions that arise whenever the topic of building a caring, cooperative classroom erupts in the faculty lounge. Each deserves a thoughtful response.

Why build a caring, cooperative classroom? Why teach students how to cooperate? There are several valid answers. Each answer may not fit every school, but all describe contributing reasons.

The following three factors have contributed greatly to the increased number of students who

have little idea about how to behave in a social organization, other than what they have learned from the negative social models that saturate their lives. As the number of these students increases, the amount of attention that a teacher can give to the academic work in school diminishes. More time is spent on correcting negative behavior, stopping for interruptions, and managing conflicts.

The Dissolution of the "Traditional" Family

Sociologists have documented the increasing number of children who come from single-parent, dual working-parent, and no-parent homes. We can now add the homeless child as well. They tell us that in today's world, these family structures are the norm, not the rare exception. These same sociologists have shown us the effects that the different family structures may have on student achievement and behavior in school (Comer, 1987). Most experienced teachers can corroborate those effects. And most parents, especially those who must raise children as the sole parent or as dual working parents, know the special challenges and unique child-rearing problems they experience. Probably nothing is more difficult than the lack of time these parents have for their youngsters. The time to sup-

port, assist, correct, model positive values, communicate expected behavior, and encourage social skills is often not there, not because the parents are bad, but because they are struggling to earn the dollars to keep the family fed and clothed. Add the decreased time and energy for proper supervision and the result is more students arriving at the schoolhouse door without the basic social skills in place.

TV Models

The change in family structure can account for only a small portion of the rationale for teaching social skills in the schoolhouse. However, when we combine the enormous number of hours that young people sit in front of the television each week with the decrease of adult supervision, support, and direction, we can readily see why the electronic baby-sitter has such a negative influence on young minds. Television, with its aptitude for modeling anti-social, anti-caring behaviors, has filled a void in the character formation of today's youth.

If a child wants to learn how adults learn to laugh, he or she needs only to copy the art of the put-down in today's situation comedies and cartoon shows. If a child wants to learn how adults solve problems, he or she needs only to watch the horror movies and the detective shows to master the arts of "shoot-em-down" or "beat-em-up." Love and kindness? Cooperation? Just review the soaps. Mutual support or caring? Try "family" shows such as "The Simpsons." Given the average student's four hours or more of television per day, it is a wonder that any positive behavior occurs on the playground or in the classroom (see Kubey and Czikszenmihalyi, 1990).

Unclear Value Focus in the School

In pursuit of our nation's desire to provide equal educational opportunity for all who come to the schoolhouse door, the desire to be free of religious influence inside the schoolhouse has caused our public schools to adopt a value-empty philosophy. This in turn has left most public schools without any focus on what is most important for students to

learn. As so many studies on school excellence have argued, a school without a focus is like a ship without a rudder. In place of the traditional value focus, an "every man for himself" philosophy often dominates. In such an environment, young people become confused and unclear. In this state, they learn little about social responsibility, mutual caring, respect, or cooperation.

PARADIGM SHIFT

The long-range reasons for taking time to focus on cooperative social skills have to do with the paradigm shift our society is experiencing with more intensity each year. That shift has the world moving from a highly individualistic "me-first" social structure to a "we-sink-or-swim-together" structure.

We see the shift all around us. For instance, we see how many major corporations weave teamwork, quality circles, vertical decision teams, and other "we" approaches to participatory management into the fabric of their organizations. In several of the top MBA programs, students are assigned team projects, work for team grades, and are evaluated for their team contributions. The international economy requires business transactions with people of very diverse cultures. Success in the shrinking global economy depends very much on finely tuned "people skills."

If the American school is going to adhere to the ideal that every child be educated to the fullest of his or her potential, the problems and challenges created by the changing world in which both students and schools exist must be addressed. The school, and more specifically, the classroom teacher, can only do so much. Given this unique challenge and given the limited resources and the increasing pressures on education, the teacher and the school must start with what they can most control: instructional time and proven methods that address the problems which most regularly block quality instruction time.

The methods for teaching cooperative social skills have not only proven their worth (Johnson and Johnson, 1989; Cohen, 1986), but also provided a framework for intensifying academic achievement, foster-

ing higher-order thinking, and extending learning into new dimensions for all learners (Joyce, Showers, and Rolheiser-Bennett, 1987).

What all this says to us is that tools do exist to counteract the problems and to move students to the high levels of learning that teachers desire. The task of moving students to higher levels of learning will require that we re-order instructional priorities, restructure curriculum, and reschedule time.

The answer to "why social skills," therefore, does not mean that a teacher has to cover less of his or her academic curriculum: it does mean that he or she will spend more time getting students ready for their academic work by taking some extra time in the beginning of the school year to change behaviors and attitudes. After the teacher takes the time at the start of the year to work on cooperative social skills, the students dig into the academic work more deeply with fewer interruptions and more time on task. Like the "little engine that could," the teacher puts a great deal more energy into getting the train to roll, but much less energy once the train is roaring down the tracks.

HOW CAN A TEACHER BUILD A CARING, COOPERATIVE CLASSROOM?

Creating a caring, cooperative classroom is a major teaching challenge. First, the attitudes promoted in the cooperative classroom run counter to the put-down, competitive culture in which most students live. Second, attitudes and beliefs don't change easily. Many students are deeply mired in negative, non-cooperative behaviors learned from their environment. Third, the effort and time needed to produce change is hard to find in the already full teaching day. But, it can be done! As Alfie Kohn (1986), Jeannie Oakes and Martin Lipton (1991), and other authors point out, there are a host of exemplary classroom models in which caring and cooperation are the rule. James Comer's work, IRI's Project Extend (Lewis, 1991), and classrooms in Washington, British Columbia, West Virginia, Oklahoma, California, and other states show that it is possible for even the most difficult and at-risk students to learn cooperative behaviors and develop caring attitudes.

One example of "best practices" in action was developed in Project Extend by a team of cooperative learning consultants. Project Extend, funded by the U.S. Department of Education's "Follow Through" Program, worked for three years in five school districts in northern Illinois. In that time, teachers and principals learned how to use cooperative learning as the critical instructional tool. Special emphasis was placed on teaching "at-risk" K-3 students how to work cooperatively, how to care about classmates, and how to respect themselves, their teachers, and their parents. Parents also learned to work with the cooperative framework and to reinforce the "we take care of each other" attitudes. As this project's research results show, a caring classroom focus can produce powerful academic results. Not only did students learn caring and cooperative behavior, they learned to read and do math at significantly higher levels than peers in the control groups (Lewis, 1991).

When is it Best to Start Social Skill Development?

A well-conceived early childhood program ought to be saturated with social skill instruction and opportunity for the young students to practice as they play together. Unfortunately, all such programs are not so well conceived. In some programs, more and more academic content is forced at earlier and earlier ages to such a degree that this rich opportunity for social skill formation is eliminated. In others, the students play randomly, sometimes alone and sometimes together. The ideal program, even at the pre-school stage, would provide some modeling, guided practice, and constructive feedback in cooperative social skills, along with language development and fun activities that make learning an active engagement for all students.

This social skill instruction cannot end with graduation into the primary grades. If anything, the primary grades can be the best opportunity for young students to fully develop the foundation of social skills which will ensure academic success and positive self-esteem in the later years. And, as students move into the middle grades where peer pressure is so strong, the encouragement and support must continue.

ENCOURAGEMENT	
Sounds Like	Looks Like
"Keep at it."	thumbs up
"Atta girl!" "Atta boy!"	pat on back
"Way to go!"	smile
"Here's another way to look at it..."	head nodding
"Great idea."	beckoning hand
"Keep trying."	
"You're getting close."	

Figure 1 Encouragement T-Chart

Some upper-grade teachers argue that today's students didn't have this foundation. Thus, they say, it is a waste of time to start now. Nothing could be further from the truth. Although it may be more difficult to introduce students already formed with negative social skills to the values of cooperation, trust, and respect, it is never too late. In fact, it is probably all the more important to take the extra time and introduce social skills even in the twelfth grade if that is what the students most need.

What is the Best Way to Teach Social Skills?

In Project Extend, social skill instruction worked best in the direct instruction transfer model pioneered by the Johnsons. This model calls for six key steps in its recipe for success.

The hook or set. This is a "hands-on" classroom experience that engages students in what the cooperative social skill looks like and sounds like. The activity works best when it is content-free, fun, and engages all the students. Hands-on activities let children observe and assess their own use of the social skills they are learning. These in-class experiences provide a foundation that fills in the "prior knowledge" void with which these students enter the classroom. Once the void is filled, they can build their learning on a solid foundation.

The lesson. After each "hook" activity, the children reflect on what they did and said in the activity. Aided by the teacher's questions, the children develop one or two lists. List one identifies specific behaviors (words and actions) of the non-example (e.g., put-downs are the non-examples of giving encouragement). They may construct a second list of the exemplary behaviors (i.e., what words and actions encourage a person) (see Figure 1). Both lists are posted and labeled as acceptable or not acceptable. Whenever possible, companion lists that identify how someone might feel when treated with the O.K. and not O.K. behaviors can be posted.

Practice or follow-up. Massed practice (short, intense, and frequent) of the targeted behaviors follows the list-making. At least once a day for five to seven minutes, structured and explicit practice of the behaviors will cement the social skill and make it a normal behavior. Social skill practices work well as a daily sponge activity at the beginning of the elementary day. They also work as a sponge to close a day. The best massed practices are content-free, focused on the acceptable behaviors, and receive positive reinforcement for their display.

When it becomes evident that the students are becoming comfortable with the social skill in the artificial practice (this usually takes several weeks

Student \ Skill	CALLING EACH OTHER BY NAME	GIVING COMPLIMENTS	STAYING WITH GROUP	FOLLOWING INSTRUCTIONS
Sue	X	X	X	
José	X	X	XXX	X
Kyle	X		X	X
Maria	X	XX	X	X

Figure 2 Assessment Chart

with some reteaching and an occasional new "hook"), it is time to embed the skill practice into daily content lessons.

Reflection, discussion, or closure. As soon as the practices begin, it is best for students to also start their "look backs" and reflections on their practice of the social skills. At least once a week during the massed practice, it is best for students to spend time in structured reflections. At this time, they are asked to look back at their use of the targeted skills and discuss what they have learned about the social skill or its use, how much improvement they are making with the social skill, and how they might improve more. When the social skill is embedded in the lesson, it is helpful for them to reflect on how the use of the social skill is helping the small group, how the skill practice can be improved, other places to use the same skill, and how group members can help each other further develop the skill.

Feedback, recognition, and celebration. As the students demonstrate improvement in the use of the targeted social skill, private and public feedback on progress is the next step. The steps identified above create perfect opportunities for "catching students doing good things."

Some teachers keep a classroom chart, marking all instances of appropriate use of the targeted social skill by each student; others chart the progress

of the class as a whole. (See Figure 2.) Some teachers use bean jars on each group's table to track each group's progress. Others hand out certificates when individuals or groups demonstrate marked improvement. Easiest of all, of course, is when the teacher stops by a group and affirms the positive behavior in very specific terms: "I like how this group is keeping its voices low by having only one person speak at a time."

To go along with the positive feedback, all-class recognition of social skill improvement and classroom celebrations for multiple successes are even more helpful for promoting transfer inside and outside the classroom. (Contrast the positive effect of writing a student's name or a group's name on the blackboard for demonstrating attentive use of a cooperative social skill to the destructive effect of publicly embarrassing the student by writing his or her name on the blackboard for disruptive behavior.) From simple "hurrahs" to certificates, popcorn parties, and earned time for every group that demonstrates growth in the day-to-day use of the targeted social skill, there are many options to let groups know that they deserve recognition for a job well done.

Transfer. To help students transfer the targeted social skill outside the classroom to the cafeteria, gym, playground, bus, and home, it helps if there is

an all-school plan for recognizing classes that excel in using the skills throughout the school. It matters little whether classroom points are tabulated with precision or the staff votes on successful applications (this is not a competition; all classes that meet the application criteria outside the classroom walls deserve recognition). What matters is that the cooperative behavior is noticed, that recognition is made public to the rest of the students, faculty, and parents, and that students continue to reflect on their own positive behavior.

Within the classroom, transfer is much easier. By selecting one or two social skills per school year, the teacher can have ample time to reinforce and extend the use of each social skill into every lesson in the classroom. The behavior charts mentioned above are an easy means to encourage children to practice the social skills all day long. Thus, once the children show understanding of a social skill, the attendant behaviors, the skill's value inside and outside the classroom, and once they begin to use it automatically, it is imperative that the teacher embed the skill in every cooperative lesson. This is possible with little difficulty and no loss of time. At the beginning of each lesson, no matter what the content, the teacher can cue the class to attend to the practiced skill. By adding an incentive such as bonus points, a group reward, or the opportunity for the groups to assess the use of the skill, the teacher can heighten the students' attention to practice of that skill.

Which Social Skills Should be Stressed?

The possibilities are endless. However, there are several cooperative social skills that may be more helpful to students and teachers alike in starting the school experience. These "foundation" skills are calling each other by name, forming small groups, attending to instructions, and giving compliments. From a practical perspective, these are the skills that ensure basic management of the cooperative classroom. More importantly, however, they are the basic tools that enable students to discover the world of mutual respect.

With the foundation social skills in place, the teacher can move to the second level of skills that seem to have the most impact: encouragement and

listening. While these are "big words" for young students, the direct instruction model makes concrete the abstract concepts of encouragement and listening. As students learn the specific behaviors associated with each social skill, they practice their use throughout each day, self-evaluate their progress, and experience the benefit of living in an environment where mutual listening and encouragement are the norm. As they give and receive positive encouragement, they empower themselves to think and believe that all learning is within their group. Caring becomes an authentic weave in the fabric of their school-life tapestry, not an isolated afterthought.

Once the students share their daily contacts with each other by listening and encouraging each other, other social skills are easily added: teamwork, collaboration, responsibility, friendship, conflict resolution, and problem solving.

What About Time?

Time is a question of priority. If caring and cooperation are an instructional priority, then the instruction will receive "time." For the direct model described here, a look at the lesson together requires thirty to forty minutes. To reinforce and review the students' applications, another ten to twenty minutes a day will suffice. If a teacher is teaching two or three social skills per year, the time is minimal. This is especially true if the teacher finds ways to integrate the practice into content lessons.

There are many opportunities to integrate social skill practices into lessons that are designed to develop reading, thinking, listening, and speaking skills through a variety of media.

- Social skills can provide a thematic bond for the reading of *literature*. Using video and print versions of classic myths, folk tales, and fables as models, children are exposed to literature as the springboard for learning about social skills. The children can be invited to examine the characters in the story and draw life lessons from the ways these literary characters solve problems and interact with others. Such video stories as "The Lion And The Mouse," "How The Elephant Got His Trunk" and "The Red Balloon" are a few examples.

- Throughout the social skill lessons, index cards can be used to label objects and to construct lists of words for *choral reading*. Overheads with simple instructions, bulletin boards with single-word procedures, and other easy-to-read methods extend oral reading opportunities throughout each lesson. In the choral reading, the teacher sounds out names attached to persons or objects and then leads the class as a chorus to practice saying the words.
- The teacher can group strong readers with readers who have lesser developed skills. The *readers are encouraged to read* as others in the small group follow along in a single text. In like manner, many social skills can be structured for the teacher to read aloud to the class. This does not mean that the weaker readers never read. It is advisable to rotate the reader and foster encouragement of fellow group members.
- Many activities invite student groups to *complete stories* or make parallel stories to enact in puppet shows or live drama for the class, other classes, or parents. If these are stories that exemplify the targeted social skill, the lesson provides a double opportunity.
- The teacher can structure group activities so that every student has the opportunity to *summarize ideas, stories, or decisions* and explain why the group decided as it did. By building in instructional strategies such as wait time, equal distribution of responses, the wraparound, fat questions, and all-student cueing (Bellanca and Fogarty, 1991), the likelihood that all students will become involved is increased. As they work on the content, they also practice the social skill.

Because students are learning these social skills to use for a lifetime, not for a test, the integration model has a unique capability for avoiding the time crunch. In addition to integration into language arts lessons, the teacher may elect to nest the social skills practice in cooperative math, social studies, science, physical education, and other subject lessons. To extend the practice, the teacher can join with other teachers to help students practice social skills in the cafeteria, the hallways, or recess.

When Do We See the Results?

At first, even the young students resist the shift in expectations from competition to caring. They feel uncomfortable. Many feel "phoney" before their peers. However, as the teacher reinforces expected cooperative behaviors, they see the changing norms. Once the "critical mass" is set, more students than not treat each other with care and respect.

What is the Best Way to Assess Student Development in Social Skills?

For the primary grades, use of the behavior T-charts will make it easiest to track individual progress. By outlining the specific behaviors the students need to develop, the teacher creates the format for behavior checklists and for evaluation.

When it comes time to report this progress to parents either on a formal report card or in an informal summary, the teacher can communicate progress on the basis of increased incidents of the desired behaviors or in comparison to standards. To set the standards, the teacher can decide how many instances of desired behaviors he or she would label as "outstanding," how many "steady," and how few "not yet." If the teacher must give a grade, he or she can write the name of the social skill that is the semester focus or use a more generic "cooperation" label on the report card (e.g., "Shows caring for classmates") and assign a letter or number grade appropriate to the number of incidents. For example:

LETTER NUMBER SYMBOL

Listening	A	92	+
Encouraging	B	84	X
Doing Tasks	A	93	+
Caring	C	79	—

In addition to the behavior measure, it is helpful to make a portfolio of student work. This may include a "Cooperation Journal" with a weekly entry that focuses on what the child believes he or she has done well in using the social skills, copies of artifacts from the child's group work, and observation notes about the child's use of social skills in the classroom.

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The student shift from competition and conflict to cooperation and caring requires a full commitment. In order to create a cooperative and caring classroom filled with students who demonstrate a genuine regard for each other, a paradigm shift at

the most concrete level is required. It is a day-to-day, concerted teaching effort, led by teachers who model and teach what they expect and celebrate what their students accomplish.

REFERENCES

- Bellanca, J., & Fogarty, R. (1991). *Blueprints for thinking in the cooperative classroom*. Palatine, IL: Skylight Publishing.
- Cohen, E. G. (1986). *Designing groupwork: Strategies for the heterogeneous classroom*. New York: Teachers College Press.
- Comer, J. (1987). Making schools work for underachieving minority students. Paper presented at a conference entitled *Our National Dilemma*.
- Johnson, D., & Johnson, R. (1989). *Leading the cooperative school*. Edina, MN: Interaction Book Company.
- Joyce, B., Showers, B., & Rolheiser-Bennett, C. (1987). Staff development and student learning: A synthesis of research and models of teaching. *Educational Leadership*, 45(2).
- Kohn, A. (1986). *No contest: The case against competition*. Boston: Houghton-Mifflin.
- Kubey, R. W., & Csikszentmihalyi, M. (1990). *Television and the quality of life: How viewing shapes everyday experience*. Hillsdale, NJ: Erlbaum.
- Lewis, M. (1991). Unpublished report on *Project Extend*. Palatine, IL: The IRI Group.
- Oakes, J., & Lipton, M. (1991). *Making the best of schools*. New Haven: Yale University Press.

DEVELOPING RESPONSIBILITY THROUGH COOPERATION

Margaret McCabe and Jacqueline Rhoades

If we expect our students to be responsible we must provide them with the opportunity to learn and practice responsibility. The objective of this chapter is to explain the relationship between cooperative learning and responsibility. To fulfill that objective we will offer a brief historical overview of the development of responsibility, how responsibility is defined and interpreted, and how specific components of cooperative learning enhance the development of personal and social responsibility.

RESPONSIBILITY—WHAT IS IT?

Historically, the characteristics associated with "being responsible" have changed as our society has changed; moving from an agricultural base to an industrial base to the information- and technology-driven world of today. At the turn of the last century, many individuals were born, lived, and died within a five-mile radius. Roles were clearly delineated. Expectations were clear. Although responsible behaviors differed somewhat from region to region and subculture to subculture, it was a rare child who did not know exactly what it meant to be responsible. Despite the changes brought by the

industrial era, individual choices regarding behavior, career, schooling, and even the selection of a spouse were often limited to the expectations of the immediate society. The skills associated with being a responsible individual were mostly taught in the home and reflected the norms and values passed on from one generation to the next.

Today, the skills needed to function as a responsible adult have become more complex. We need a set of skills just to deal with the rapidity of changes occurring in our world. Technological developments have expanded our national and international awareness to the point that we know we must think and act globally; we can no longer limit our feelings of responsibility to our city or even to our state or country.

Since it is the role of our school system to prepare students for the world into which they will graduate, discussion about the school's role in any area of concern can be enhanced by knowing some of the changes we can expect in the next ten years. Conversations with Dr. Norman Feingold, an internationally known expert in the area of careers, indicate that half of the jobs that will be available to today's kindergartners when they enter the work force do not yet exist. Dr. Feingold also stated that

individuals will change careers five to seven or more times in their lifetimes.¹

Marvin Cetron in *The American Renaissance* wrote:

- In the next ten years the amount of raw knowledge will double and it will double again in the following ten years.
- By the turn of the century, 85 percent of employed adults will work in the service sector.
- Diversity will become valued.
- Within professions the body of knowledge that must be mastered to excel in a particular area precludes excellence across all areas (Cetron & Davies, 1989).

The fabric of the American society is changing. Families are on the move; the support system of the extended family is diminishing and the percentage of households with both parents working is increasing. Single-parent homes are also on the rise. The average amount of one-to-one contact time between parent and child is now approximately fifteen minutes per day.

While the skills required to become a responsible individual have increased, the traditional support system for transmitting these values, the family, has eroded.

The demands placed upon the education system to adjust to the requirements of the information age have been significant. A restructuring of curriculum content and of the process for disseminating that content has become an urgent task. While the "three Rs" remain essential components, the need to prepare our students for a rapidly changing world has become an imperative. The success and well-being of individuals and of our nation rest upon the school system's ability to produce responsible, thinking adults. But, what is responsibility and what characteristics are found in the responsible person?

The final report of the California Task Force to Promote Self-Esteem and Personal and Social Responsibility defined self-esteem as "appreciating my own worth and importance, and having the character to be accountable for myself, and to act responsibly toward others" (California Task Force, 1990, p. 18).

The task force clearly affirmed the intricate interrelationship between self-esteem and responsibility by adopting as one of its premises: "Nurturing healthy self-esteem relates directly to and provides a solid foundation for developing personal and social responsibility" (California Task Force, 1990, p. 22).

The task force concluded that personal responsibility involves taking care of one's health; adopting a set of basic values that may include trust, honesty, truth, openness with self and others; making careful and informed decisions; and accepting the consequences of our actions rather than blaming others or circumstances if our decisions do not result in the outcome we wanted or expected. Citing the disposability of our current lifestyle, the task force also includes as an aspect of personal responsibility a willingness to make and honor a commitment.

We act responsibly toward others when we treat people with respect and dignity; when we experience a sense of competence; when we provide a feeling of belonging to others; and when we are involved in establishing rules and consequences of failing to follow those rules (California Task Force, 1990, p. 35).

Ernest Boyer suggests that civic education programs intended to help students become responsible should have several characteristics:

"Civic education is concerned, first, with communication. The work of a democracy is carried out through thoughtful discourse—town meetings, city councils, study groups, informal conversation, the television screen—and citizenship training, if it means anything at all, it means teaching students to think critically, listen with discernment and communicate with power and precision" (Boyer, 1990, p. 5).

Boyer further comments that students in the civics classroom should not be passive, limited to writing papers or reading texts. Rather, the classroom should be an active place where students participate in mock trials and role play different governmental situations; students should be involved in the decisions made in the school as practice for what life will later require of them; and students should be helped to understand the relationship "between what they learn and how they live." Boyer believes that "education means devel-

ATTRIBUTES OF RESPONSIBILITY

- Being accountable for one's own actions: being answerable, acknowledging one's acts, not blaming others for one's own mistakes.
- Analyzing a situation and making careful decisions based on that analysis.
- Accepting the consequences of decisions and choices, i.e., not blaming circumstances or other people if choices yield undesired results.
- Ensuring one's own physical health.
- Having an awareness of the needs of a group and the ability to use this awareness to help the group work or live together more effectively.
- Getting along with others.
- Understanding other points of view.
- Having organizational skills.
- Knowing how to achieve consensus and make group decisions.
- Understanding how trust is developed.
- Being trustworthy.
- Growing toward independence—the ability to act on one's own, without being specifically directed by someone else.
- Growing toward interdependence—recognizing that no one lives in a vacuum; that what one person does affects others; and that working together results in greater success.
- Having the ability to make moral and rational decisions. Being capable of making these types of decisions presupposes a set of values within the mores of the society, knowledge of acceptable social behaviors, and an understanding of cause and effect.
- Being concerned with local and global issues.
- Having the ability to communicate with others.
- Understanding the economy well enough to handle personal finances.

Figure 1 Attributes of Responsibility

oping the capacity to make judgments, form convictions, and act boldly on values held" (Boyer, 1990, p. 7).

Sheldon Berman, president of Educators for Social Responsibility, notes: "Social responsibility is a personal investment in the well-being of others and of the planet" (1990, p. 75). Berman identified several aspects of social responsibility, including: developing a "consciousness of group," i.e., becoming aware of group needs, then using this consciousness to help the group more effectively work and live together; being able to understand another's point of view; having organizational skills; and having the ability to use consensus building and group problem-solving skills.

Berman (1990, p. 77) and Keister and Resnik (1990, p. 29) both suggest that in order to develop responsibility, students must be taught specific social skills such as effective communication, problem solving, and cooperation.

Finally, the American Heritage Dictionary defines responsibility as the act of being:

- Legally or ethically accountable for the care and welfare of another.
- Involving personal accountability or ability to act without guidance or superior authority.

- Capable of making moral or rational decisions on one's own and therefore answerable for one's behavior.
- Capable of being trusted...
- Having the means to pay debts or fulfill obligations" (DeVenne, 1985, p. 1053).

Clearly, responsibility is an abstract concept subject to different interpretations. There are, however, clear characteristics and attributes of responsibility that can be used when planning and developing specific educational goals or outcomes of instruction (see Figure 1).

Helping students develop responsibility means teaching:

- Critical thinking.
- Effective communication, including perceptive listening, and clear, precise speaking.
- Problem solving and conflict management.
- Cooperation.

We cannot expect our students to develop a sense of responsibility for themselves or for the society in which they live by simply talking about it. Developing responsibility is an active exercise. We

need to provide instruction in the skills involved with responsibility but, perhaps more importantly, we must provide our young people the opportunity to learn about and develop a sense of responsibility through experience. In other words, we must provide them multiple opportunities to be responsible.

The final report of the California Task Force to Promote Self-Esteem and Personal and Social Responsibility suggests we act responsibly when we encourage people to grow beyond dependence toward independence and interdependence. Bringing this principle into the classroom requires a role change for many teachers. The traditional role of teacher as sole expert fosters dependence; the role of facilitator of learning fosters independence; and teachers and students becoming facilitators fosters interdependence.

One of the recommendations of this same task force was to encourage the use of cooperative learning strategies in *all* areas of instruction because these strategies "are among the best researched innovations within education. Hundreds of studies demonstrate academic, social, and psychological benefits from well-implemented cooperative learning programs, with improved self-esteem and a sense of shared responsibility being important outcomes" (California Task Force, 1990, p. 81).

COOPERATIVE MEETING MANAGEMENT TECHNIQUES

Cooperative learning as an instructional process inherently helps students develop responsibility because each student is not only accountable for her or his own performance, she or he is responsible for helping fellow group members know and understand the assignment.

Incorporating cooperative meeting management techniques further enhances individual responsibility. These techniques are based on the premise that every classroom is a meeting place. Students and teachers meet for the broad purpose of gaining knowledge and skills, to enhance abilities, to further develop strengths while improving areas of weakness, to explore novel ideas, and to revisit old ideas.

Our classrooms need to be safe environments where our students can take risks to reach and exceed their perceived ability levels and where each and every student feels important and valued. In other words, our classrooms should strive to become micro-communities. Introducing specific elements of the cooperative meeting management process into the classroom routine will promote these goals.

The first step in setting up a classroom based on meeting management theory is to recognize the factors inherent in group development. Whenever people assemble a group is formed. Some groups come together as a cohesive unit almost immediately. Others do not come together; they remain a collection of individuals in the same space, never seeming to agree on anything, never establishing supportive relationships, and usually failing to accomplish their goal.

Students in a cooperative classroom become a cohesive group with the teacher's guidance. A community is established with students caring, helping, and respecting each other. These students not only learn about responsibility, they gain social skills, enhance self-esteem, and increase their academic performance. To create the type of environment that fosters these characteristics takes time, effort, and energy but it is well worth it.

Teachers will need to guide their students through each of the following six stages in the group development process (Rhoades & McCabe, 1989) as shown in Figure 2.

Stage I—Setting Standards

Any group that meets on a regular basis will eventually develop a set of norms, behaviors that are expected or acceptable within that group setting. If the group is to be an effective one, meeting its objectives and accomplishing its goals in a timely manner, the first step is to establish these standards of behavior.

This is also true in classrooms. Unless the teacher establishes beginning norms, or standards of behavior, students are left in the untenable position of not knowing what is acceptable and what is not acceptable. Students are then forced to learn through trial and error and by observing the consequences their classmates face for certain behav-

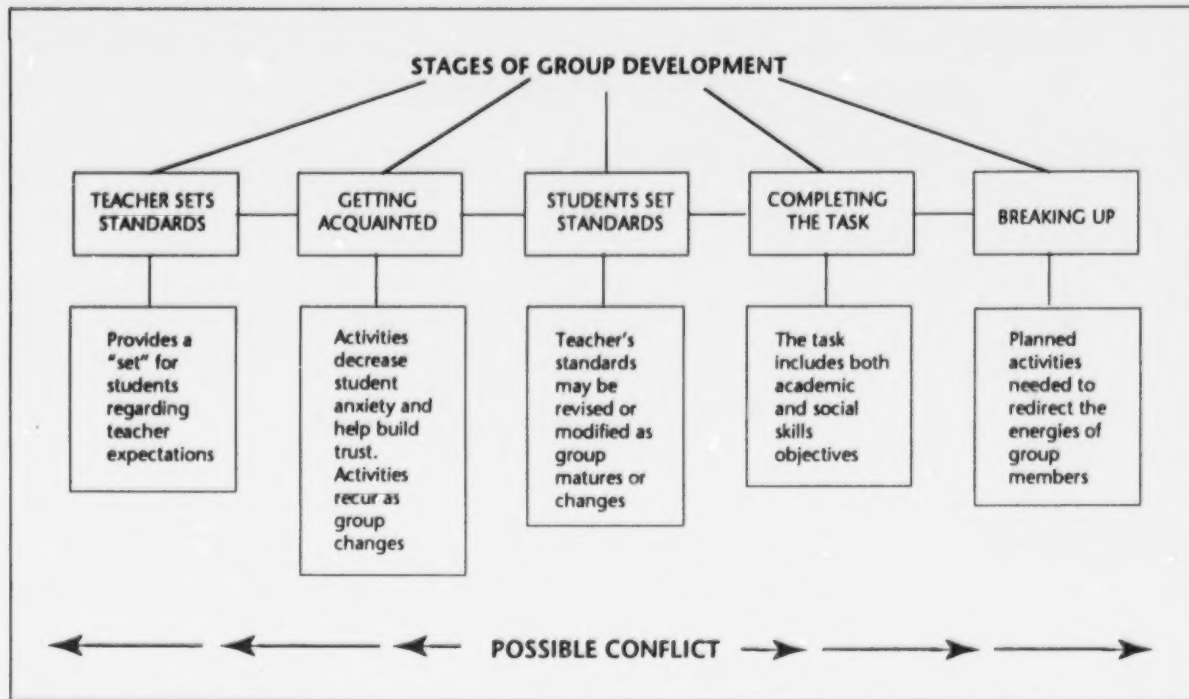


Figure 2 Stages of Group Development

iors. For example, Mark observes that nothing happens when Jack and Marie talk to each other while the teacher is explaining an assignment so Mark talks to Anne who is sitting next to him. A norm is beginning to become established that it's okay to talk to your neighbor while the teacher is giving directions. The likely result is that as soon as several students are talking to each other, the teacher will become angry and students will be reprimanded. The incident could have been avoided if initial standards had been set and explained.

So, the first step in developing a cohesive cooperative classroom is for the teacher to set standards in a conscious, directed manner and then to explain and model, if necessary, what is meant by each standard. To set standards, community norms and values as well as district and school rules must be considered because classroom rules cannot contradict the already established standards of community and school. Teachers need to think about what is really important, what behaviors are completely unacceptable and what behaviors are an absolute must. It is best to begin with no more than

five standards of behavior and each should be phrased in positive terms: e.g., "Raise your hand before speaking," rather than "Don't speak out."

Sample Standards:

Be on time. This means that students are responsible for being in their seats or work areas at the appointed time.

Be responsible for your own learning. This is a different approach than we usually see in our nation's classrooms. It means that the teacher will: do everything possible to provide a stimulating and exciting learning environment; share as much information, data, and materials as possible; offer as many experiences as possible; and be available to listen, discuss, or otherwise promote mutual learning. It is then the students' responsibility to avail themselves of the resources and to share their own ideas.

An addendum to this standard is that students must first request help from other members of their group. In other words, if students are confused, have questions, or miss something, they must first ask other group members for help. If no one in their group can help, the student then asks the teacher.

Students' questions should always be answered but students must take the initiative to clear up any confusions they may experience.

Be responsible for your own materials and assignments: Students have a responsibility to themselves and their cooperative group members to carry their share of the work load. A clear procedure outlining how to gain access to resource materials should be posted for students. This will help students actualize their responsibilities.

Only one person can speak at a time: This is one of the beginning steps in teaching communication and meeting management skills. It cannot be assumed that students of any age have internalized this basic socialization skill. This standard gives a strong message that what each student has to say is important and students are to show respect for each other's contribution to the group effort.

Keep your work and desk area clean: Students are responsible for their personal space and the areas used by everyone.

Stage 2—Getting Acquainted

The first time students enter a classroom in a small school they may already know all or most of the other students. In larger schools, however, they may recognize only one or two other students. Taking time to help students become acquainted with each other will develop group cohesiveness, or a sense of community, more quickly. This, in turn, promotes accelerated learning of both social skills and academic content.

There are numerous getting acquainted activities that can be completed within a few minutes. Examples include a variety of interview questions about information such as: name, number of brothers and sisters, favorite food, pets, favorite things to do, etc..

Two other types of activities closely related to getting acquainted activities are *openings* and *transitions*. Opening activities are used at the beginning of the school day; they help students get ready for their school work by developing a "mind-set" for the day. An example of an opening activity is the Focus Worksheet (see Figure 3), which is a prepared worksheet on which three to ten questions have been listed. The questions may be academic,

social, trivia, or a combination thereof. Each student receives a copy of the worksheet with instructions to complete it by interviewing fellow students. Give a specific amount of time to complete the activity, five to fifteen minutes depending on the complexity and number of questions. Be prepared for a lot of movement and a relatively high noise level. At the end of the time, the teacher can have students hand in their completed worksheets or discuss each question with the entire class.

The Focus Worksheet is excellent for reviewing and reinforcing material, preparing for a test, becoming better acquainted, and for preparing students for the school day.

Stage 3—Students Setting Standards

This stage of group development provides an opportunity for students to have a say in the class rules. It empowers them; it tells them their thoughts and opinions are important. Providing students the opportunity to set standards of behavior for their classroom is collaborative management. This step gives students the chance to become self-regulated which leads to sense of social responsibility. It also teaches them that by following specific procedures, they can make a difference. As a high school principal, one of the authors offered students the opportunity to challenge and change established school rules or to add others. By following a specific process that included gaining consensus of the student body, approval of local merchants, approval of faculty and finally of the school board, students successfully had the campus changed from a closed to an open one at lunchtime.

Each teacher must decide which initial standards may not be changed and when it is appropriate to offer students the opportunity to review standards. New standards can be set by students only with a consensus decision from the class as a whole.

Stage 4—Completing the Task

In this stage students work, individually and in cooperative groups, toward academic and social skills objectives. Some teachers will be able to involve their students in setting standards before any serious academic activity occurs. Other teachers will not involve students in setting standards until weeks into the term.

FOCUS WORKSHEET	
INSTRUCTIONS:	
(a) Find someone who can and does correctly answer the following questions or who fits the description.	
(b) Have that person sign on the appropriate line.	
(c) Each question or description should be signed by a different person.	
(1) What are getting acquainted activities?	_____
(2) Describe the major stages of group development:	_____
(3) Someone wearing blue:	_____
(4) What is one definition of "responsibility"?	_____
(5) Someone who ate spinach last week:	_____

Figure 3 Sample Focus Worksheet

Stage 5—Breaking Up

There comes a time for each group to end, to break up. This can be a difficult time for students in a cooperative classroom because the group has become a cohesive community. Students can work through their feelings of loss and anxiety if activities are carefully planned. These activities must help provide a living memory of their time together and also redirect their energy to the next phase of their lives. Activities such as exchanging photographs, planting trees, writing a letter to the next class, and visiting the next grade level help with a difficult transition.

Stage 6—Conflict

The sixth and last stage in the group development process is conflict. In actuality conflict is not a stage in the normal sense of the word. It does not occur at a specific time in a sequence; it can occur at any time in the group development process.

Conflict is a normal part of any relationship development process, whether between two people or among a group. As intimacy is gained, students will feel safe enough to express their opinions, thoughts and feelings and the teacher will be faced with conflict.

Strangely enough, conflict is most likely to occur during the last weeks of the school term. The reason for this is because students are suddenly faced with losing the group they have come to trust.

Anxiety and frustration accompany this feeling of loss which is similar to the grief cycle. Disagreements and conflict occur as ways of dealing with these feelings. (It's a lot easier to leave someone you like and trust if you have a fight—you can go away angry.)

Planning and implementing breaking up activities will diffuse much of the conflict that can occur at the end of the year. Knowing and using the process of group development is an important tool in instilling the concepts of responsibility in young people. The next step when incorporating meeting management techniques in the classroom is to integrate group roles into cooperative lessons.

Teaching and using group roles associated with meeting management will encourage shy students, students with low self-esteem, and low-performing students to participate. Roles will build their self-confidence, which will be reflected in greater academic achievement. At the same time, group roles will encourage verbose students to share some of the limelight with the quieter students.

Group roles help students become aware of how their actions affect the group's productivity. Students develop a sense of responsibility for their own behaviors. Group roles, however, do not occur spontaneously. Each needs to be introduced, explained, modeled, and practiced. Introduce one role at a time and give students sufficient time to practice and master each role before moving on to

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the next one. Roles should be rotated among students so that every student has the opportunity to develop the skills inherent in each role. Rotating roles also reinforces the concept that each student is of equal importance to the group.

You will notice that we do not include a role called "leader." We want students to share equally in the responsibility of the group's outcome, with leaders come followers. Groups tend to depend on the "leader" to take more responsibility for completing the assignment; we want each student to take this responsibility.

It's best if the teacher assigns the roles for each group, especially during the first several months. There are a couple of reasons for this: first, teacher-assigned roles eliminate the possibility of conflict that can arise when two students in the same group want to be the facilitator; second, the teacher can assure that each student will have the opportunity to perform each role multiple times during the school year; and third, knowing the skills of each student, the teacher can assure a successful experience—as an example, the teacher would not assign the role of recorder to a student who could not write.

Assign only the roles needed for each activity, i.e., if nothing needs to be written to complete the assignment, the recording role is not assigned.

In our experience, the roles that are beneficial in most classrooms are:

Group Member: Unfortunately, too many people think they know what it is to be a group member—you attend the meeting and perhaps even participate, but you wait for someone else to take the lead; it is also somebody else's responsibility to make certain everything runs smoothly. This attitude results in one or two students doing all the work for the group. This is not a cooperative effort. Clearly identifying the group member as a critical role with specific responsibilities will reinforce the concept of individual accountability.

When explaining the role of group member, point out that this is the most important role because we are always group members and the success of the group is dependent upon every member doing his or her share of the assignment.

The following list reflects the responsibilities of the group member and the reason each is important:

- Arrive on time because tardiness breaks the flow of work already in progress.
- Actively participate by contributing ideas and suggestions.
- Attend to the task and refrain from distracting the group with behavior unrelated to the task, because time is wasted and the quality of the product lowered unless every member gives undivided attention to the task at hand.
- Help the group complete its assignment; group members are collectively and individually responsible for the completion of the assignment.
- Follow through on assignments and agreements made in the group. If one member does not complete his or her part, the group product will be incomplete.
- Take turns speaking and listening to other members; this reinforces the concept of equal importance.
- Encourage other members of the group to share their ideas.

Facilitator-as-Monitor: This role is the same as the traditional monitor role. We refer to it as a facilitator because the title familiarizes students with the terminology, which prepares them for the more complex facilitator role.

Responsibilities of the facilitator-as-monitor are to:

- Get and distribute written assignments to group members.
- Quietly and quickly get the materials necessary for the completion of the assignment or project such as the dictionary, thesaurus, or other reference sources.
- Collect group work and turn it in to the teacher.

Beginning Recorder: This person's job is to keep a record of the group's discussion and ideas as

they relate to the assignment and to write the group's responses for the assignment.

Praiser: The praiser's job is to give compliments and praise to members of the group for specific preselected behaviors such as: staying on task; completing assignments; returning quietly after a break; listening to others; paraphrasing, and so on.

More often than not, students do not know how to give and receive compliments or praise, yet giving and receiving praise gracefully and sincerely is a very special and important social skill. This is also a skill that requires direct instruction.

One activity that helps students learn how to give compliments or praise is to have the class brainstorm some praising statements and write them on the chalk or white board. Those that come up frequently include: "Good job;" "Good idea;" "You're really listening to others;" and whatever the current vernacular is among our youngsters; some examples from the past include: rad, bad, and awesome. Students tend to go overboard when first learning this skill; the praising sounds really phony but eventually students become more sincere and perceptive, and praising becomes a normal part of their communication and interaction process. The role of praiser helps students learn to focus on the positive rather than criticizing or finding fault with others.

Timekeeper: The role of timekeeper is a simple but important one in the group. The timekeeper helps the group pace itself by keeping track of how much time has been used for a task and how much is left to complete the task. It is important to give examples of when and how to give the group time alerts. With one class, one of the authors did not make it clear enough about when to give warnings; in one group the timekeeper interrupted the group every five minutes telling the number of minutes used and the number of minutes left.

To teach this role, explain and model the responsibilities:

- Periodically tell the group how much of the allotted time has been used and how much is left to complete the assignment. For example,

if forty-five minutes has been allocated to writing a paper, the timekeeper would say something like: "We have used twenty minutes and we have twenty-five minutes left."

- Give fifteen-, ten-, or five-minute warnings before the expiration of the time, as appropriate. The warning times depend upon the amount of time allocated. When a half-hour is provided, it's helpful for the group to have fifteen- and five-minute warnings; when only fifteen minutes are allotted for the assignment, five- and two-minute warnings are appropriate.

Checker: This role is used when students are reviewing or studying material that has a correct answer, such as spelling words, vocabulary, or math facts. The checker has the answer key and tells group members whether their answers are right or wrong. If the response was incorrect, the checker provides the correct answer.

The role of the checker may be rotated around the group by passing the answer key to the next student after each question.

Observer: The observer's role is descriptive only. Its purpose is to improve group interaction and increase the efficiency and effectiveness of the group by giving an objective report about how often a desired behavior is occurring.

The observer is assigned a specific behavior to observe. He or she sits just outside the group in a position that makes it possible to see and hear each member. Using paper and pencil, the observer counts and records the frequency of the specified target behaviors. At the end of the time period, the observer reports back to the group.

The observer's report recognizes and reinforces behaviors that enhance group success without condemning or judging the lack of those behaviors.

The key to understanding the observer role is knowing what a behavior is. It is something that can be seen or heard; it is tangible and it can be counted, i.e., it is quantifiable. A behavior is not an attitude, value, feeling, or judgment. "Jamie is nice" is not a behavior, it is a judgment. It doesn't say anything about Jamie because we each have differ-

ent perceptions of what "nice" is. "Jamie invited me to play a game with him" is a behavior. It can be seen and it gives a clear statement of what Jamie did.

To teach the observer role, it is first necessary to conduct a lesson on the difference between behaviors and feelings and judgments. One way to lead this lesson is to write two columns on the chalk board; one column for behaviors, the other for feelings or judgments. Elicit from students words associated with each. For example, words in the behavior column might include: late to class; offers ideas; asks questions; makes noises. Words in the other column might include: rude; impolite; distracting; nice; courteous.

Assign the role of observer for only five to ten minutes at a time. The observer:

- Is objective, not evaluative or judgmental.
- Sits just outside the group but close enough to see and hear what is being done and said.
- Counts and records the frequency of a specified target behavior. (Students must have been taught and have practiced the behavior being observed.)
- Gives an oral report to the group at the end of the observation time. It is important that the report be given with neither emotion nor editorializing comments; this includes such subtle cues as: "Chuck praised four times, Lillian only praised two times." The interjection of the word "only" is a qualifier and denotes an evaluation. Tone of voice, raised eyebrows, smiles, frowns, and other nonverbal cues also act as powerful evaluations and detract from the purpose of observation.

Other points about the role of observer:

- Observe only behaviors that have been taught and practiced.
- Make positive observations about behaviors. For example, observe "taking turns speaking" rather than "did not interrupt others." Positive observations enhance the supportive atmosphere of the classroom and focus on what you are trying to have students learn.

- Primary-age children and nonreaders can be taught to observe. Symbols or pictures can identify the behavior, e.g., a picture of children engrossed in reading or writing to represent "on-task" behavior. Color codes can be used instead of names, with each student wearing a colored tag that matches a space on the observation form. The observer can then make a mark next to the appropriate colored space to count how many times each group member demonstrates the specific skill (McCabe & Rhoades, 1989).

As mentioned before, these are just a sample of the roles that can be used in the classroom. There are many others that can be introduced to help students to learn how to work within a group more effectively and to develop responsibility.

Teaching cooperative meeting management roles, effective communication techniques, problem solving, and conflict management leads to more responsible, community-conscious students. Students realize they are not lone entities; they learn that their actions or inactions affect others as well as themselves. Their learned social skills make them better prepared for future academic, social, and occupational endeavors.

CONCLUSION

What happens when students become responsible learners? Students become more enthusiastic learners, their learning and retention increase, and both students and teachers have more fun in school. Cooperative learning provides a research-based methodology for the classroom teacher to teach social skills. Cooperative learning is a vehicle through which personal and social responsibility can be developed and reinforced.

NOTES

1. Norman Feingold. National Careers Center. Washington, D.C. Continuing conversations 1982 to present.

REFERENCES

- Berman, S. (1990, November). Educating for social responsibility. *Educational Leadership*, 48, 75-80.
- Boyer, E. (1990, November). Civic education for responsible citizens. *Educational Leadership*, 48, 5-7.
- Boyer, E. (1988, Fall). The future of American education: New realities, making connections. *Kappa Delta Phi Record*, pp. 6-12.
- California State Department of Education. (1987). *History-Social Science Framework*. Sacramento, CA: author.
- California Task Force to Promote Self-Esteem and Personal and Social Responsibility. (1990). *Toward a state of self-esteem*. Sacramento, CA: California State Department of Education.
- Cetron, M., & Davies, O. (1989). *The American renaissance*. New York: St. Martin's Press.
- DeVine, P. (Ed.). (1985). *The American heritage dictionary*. (2nd college ed.). Boston: Houghton Mifflin.
- Educational Leadership*. (1989, December - 1991, January). Alexandria, VA: Association for Supervision and Curriculum Development.
- Feuerstein, R. (1980). *Instrumental enrichment*. Baltimore, MD: University Park Press.
- Goodlad, J. (1984). *A place called school*. New York: McGraw-Hill.
- Keister, S., & Resnik, H. (1990, November). Responsibility is an active word. *Educational Leadership*, 48, 29.
- McCabe, M. E., & Rhoades, J. (1989). *The nurturing classroom: Developing self-esteem, thinking skills, and responsibility through simple cooperation*. Willits, CA: ITA Publications.
- McCabe, M. E., & Rhoades, J. (1986). *Cooperative meeting management*. Willits, CA: ITA Publications.
- Meichenbaum, D. (1979). *Cognitive behavior modification*. New York: Plenum Press.
- Reische, D. L. (1987). *Citizenship: Goal of education*. Arlington, VA: American Association of School Administrators.
- Rhoades, J., & McCabe, M. E. (1985). *Simple cooperation in the classroom*. Willits, CA: ITA Publications.
- United Way Strategic Institute. (1990, July-August). Nine forces reshaping America. *The futurist*. Bethesda, MD: World Future Society. pp. 9-16.

THE POWER AND THE PROMISE OF COOPERATIVE LEARNING

—
Marie Meyer

The decade of the 1990s has ushered in an era in education with powerful research-based practices making it comparable to the decade of the 1950s in medicine with the advent of antibiotics. Teachers are coming to the realization that learning to teach takes a lifetime and that an education does not result from passive learning but from thinking actively, creatively, holistically, and collaboratively.

Cooperative learning has the power and the promise to transform teaching and learning beyond the classroom walls to the family, the community, the voting booth, and the workplace. It is more than just another method for instruction; the philosophy and conceptual model are preparation for a world characterized by interdependence, pluralism, conflict, and rapid change.

The factory model that has served as the structure for American education for decades is based on competitive rote learning and on the view that schooling is finished at some point, rather than on the concept that learning is a life-long process. Nowhere is there more reluctance to change this model than at the high school level. Finally, however, more and more risk-taking and confident high school teachers have begun the shift. The age

of cooperation is approaching, from Alaska to California to Florida to New York, from Australia to Norway to Israel to Britain, with increasing numbers of students in secondary schools having the opportunity to join a community of learners. There is growing substantial evidence that high school students who are working successfully in small cooperative groups master content better than students working on their own. One only has to interact with high school teachers practicing cooperative learning to experience the successful transformation that is taking place for both the students and the teachers.

IN THE SCHOOL

Glenbrook North High School

"I have been teaching high school mathematics for ten years and I used to be able to tell in the first three weeks of a semester which students would make it and which would not. Now, with few exceptions, everyone in my classroom is successful," reports Dan Workman, a math teacher at Glenbrook North High School, Northbrook, Illinois.

Dan Workman and Sonia Reardon, a special education teacher, both teach at Glenbrook North

High School, District #225, Northbrook, Illinois. They have been team teaching and using cooperative learning in basic track algebra classes for the past three years. They report that cooperative learning is not only good for the students but is good for the teachers as well; "Formerly, working with a lower-level algebra class was boring." In a cooperative learning classroom, the students concentrate and are more creative; they experience successes which they would not normally achieve in a non-cooperative classroom taught by one teacher."

Dan and Sonia compared traditional and cooperative classes in a study using quizzes, tests, homework, and individual student surveys. Special education students were included in both the experimental group and the control group. The experimental group was consistently more confident in its ability to master algebra and expressed a higher expectation that they would learn more in their algebra course than in their other courses. Identified handicapped learners also expressed higher confidence. A comparable percentage in both the experimental and control groups indicated a desire to learn algebra, but the experimental groups were significantly higher in valuing algebra. This included considering algebra as a way to see things from different perspectives, finding it enjoyable and viewing it as a means to learning new communication skills, as a vehicle for cooperating, and as a means to respect others' rights. These ways of valuing algebra indicate an ability to appreciate multiple perspectives and to use communication and cooperative skills.

In the data on relationship skills, the control group reported significantly higher incidents of *not* knowing their classmates. More experimental students expressed caring about others' failing; the control groups were convinced that someone has to fail. The data supported the conclusion that members of the experimental classes knew each other better, cared more about each other, and were more supportive of each other.

In comparing test scores, there was little noticeable difference on the variability in test one but by test three an interesting trend developed. The means for the two groups remained close; however,

the variability in the regular class increased. In the cooperative group, fifty percent of the scores fell in the 82-92 range, while in the regular class the range was from 72-90. Students in the cooperative group gravitated toward the mean, while the regular group became more divergent.

In comparing homework and six-week averages for first-semester classes, the experimental group averaged 83.2 while the regular class averaged 65.1. In the cooperative section peers helped peers complete homework so that it was finished on a regular basis. This was reflected in less variability of scores in this section. What makes the data even more remarkable is the failures had been removed from the regular class.

The teachers report that what happened in the cooperative learning classes didn't happen in the regular classes. As one teacher said, "It was interesting to see that [in the cooperative class] the brighter students didn't just want to work with the other brighter students and that their goal was not only to get through the work and get the right answer." Both teachers report incidents where students set aside time in study hall and after school to help each other, and even when they switched groups every six weeks, they would still continue to work with students that they had gotten to know in the former group. The students reported that this was a really different experience than they had in other classes and that "it almost felt like a family."

Sonia said the group experiences helped students who would formerly have been afraid to answer or ask questions, sometimes because they "would feel stupid." These students progressed to being willing to ask questions in front of the whole class. For them this was the biggest learning and growing experience. Several girls had indicated that they were intimidated by going to the board and working problems, so each group was given overhead transparencies and markers and allowed to prepare a problem. They drew visuals to present to the whole class. Then, instead of one person going to the overhead, the group of students would go there together and they would feel a lot more confident. During a grading period, a group's average on quizzes was used for a special prize from a "Treasure Chest" for the group whose average in-

creased the most. Banding together gave them a certain spirit and they charged ahead and also encouraged other groups. Dan and Sonia found students giving each other "high fives" and congratulating one another. At the high school level it is strange even to hear a student say "thank you, you really helped me out." Having students giving one another a "high five" and saying "good job" was unusual; but even though the students felt odd, they continued to do it.

Dan reports he knows his students better because he doesn't stand in front of the room talking at them, but walks among them and talks with them. Now, when he meets these students in the hall, even after they are no longer in his classes, they let him know how they are doing in math.

Wilmington High School

Barbara Hansen, a high school English teacher in Wilmington High School, Wilmington, Illinois, graphically portrays "BC" (before cooperation) and "AC" (after cooperation).

"My desks were in neat rows. Students took notes as I lectured. I covered the curriculum. I called on students who raised hands. It was a classic picture of a well-managed high school English class. Like many classrooms across the country, mine was quiet, orderly, systematic, and nearly antiseptic. I was a traditional high school teacher who taught individualistically; that's how I had been taught to teach. Now dramatic changes are occurring in my classroom, and cooperative learning is the catalyst. Some of the changes are the kind that are measurable; for instance, student failure rate has dropped by 15 percent to 4 percent; but, more importantly, the student success rate has markedly increased, not through grade inflation but through student production.

What produced these results for Hansen? How firm was her data? Hansen reports: "On a vocabulary unit, I divided the mastery words into two sets. The first set I taught traditionally, i.e., individualistically, and the second set I taught cooperatively. Students took mastery tests on their own. A comparison of the two sets of test scores showed that only 24 percent of the students achieved results in the A/B grade range on the portion that was

learned individualistically, while 76 percent scored in the A/B range when the cooperative structure was used. The class average increased from 71 percent to 92 percent, with more than two-thirds of the students showing improved test scores after using the cooperative method for learning. The whole process was repeated the following year on the same unit and had similar results. The conclusion was simple: student achievement on vocabulary work increased dramatically when students were engaged in cooperative learning strategies."

In addition, Hansen reports on other kinds of changes in her classroom that were not as easily measured but were present and valuable. "When my students work cooperatively they enjoy it," she says. "In small learning teams, they increase each other's chances for success by creating mnemonic devices to aid retention and by drilling, quizzing, and checking each other's understanding. Verbalization is required from each group member. It is the old 'cognitive rehearsal' game, but with a new twist: they are having a good time while doing vocabulary work."

While monitoring the groups, Mrs. Hansen observed that the students were staying on-task, smiling, laughing, and creating clever, humorous ways to help each other remember the material. Somehow, she noted, learning and enjoyment had become separated in her traditional classroom; in her cooperative classroom, learning and enjoyment are together where they belong.

Hansen took cooperative learning beyond vocabulary and regurgitation. In her American literature curriculum, high school juniors had perennially studied Thoreau's *Walden*. They seldom liked it. Hansen's standard, traditional lesson plan included having students take notes during a lecture, read from the text, answer some study questions, and take a test. How did her plan differ when she translated *Walden* into a cooperative lesson?

"First," she reports, "I divided an introductory lecture into small segments, ten minutes in length, with each segment ending by requiring students to make a prediction. Students form impromptu 'summary pairs' by turning to a partner; each partner summarizes a lecture segment for two minutes.

Then the pair comes to consensus on a response to questions. Pairing of two students gives the opportunity for immediate verbalization and for encountering the material twice during the class period—first as passive recipients during a lecture—then as active participants in their pairs. The following day, students work in their formal task groups, which are pre-assigned to insure mixed ability levels with the objective to help ‘un-confuse’ each other about the assignment. The next step is to apply what they have learned. Each group is given one sheet of thoughtful questions such as, ‘Let’s imagine that Thoreau is your contemporary. He is a teenager attending this high school right now; what would he think about the computer club? The social security system? The use of a charge card? If he wanted to make popcorn, would he use the microwave, the fireplace, or the stove top?’ Each group member is given a special responsibility to perform for the group, and all are expected to work on the collaborative skill of ‘elaboration.’ Individuals are called on at random to determine whether the group has been successful.”

I observed a *Walden* class in action. As the students dig through *Walden*, sifting out pertinent facts, and probing their way to conclusions, I think of the countless times I was “handed” a lesson to cover the material. Now these students are uncovering ideas and enjoying it. Hansen spends a few minutes at the end of class helping the groups reflect on their academic insights and collaborative skills. One student asks, “Will you let us do some more of this Thoreau stuff tomorrow?” Hansen beams. I infer her pride and her pleasure in a lesson in which she was not the sage on the stage. That is the cooperative difference.

Joliet West High School

Joliet West High School in Joliet, Illinois, received an Urban Education Partnership Grant to implement Project T.E.A.M. (Together Each Accomplishes More) in August 1988 to meet the needs of minority students. Project TEAM focuses on reducing high failure and referral rates among freshman in regular level classes. Heterogeneous homeroom-like settings, called freshman seminars, provide a mainstream setting for at-risk students.

Three years of intensive teacher training in cooperative learning provided the foundation for Project TEAM. Joliet West High School's program for at-risk students focuses upon Ouchi's *Theory Z* (1982): “Everything important in life happens as a result of teamwork or collective effort.”

Maureen Dombrowski, Chapter I reading coordinator, directs the project at Joliet West High School. More than seventy faculty members trained in cooperative learning reinforce the collaborative and study skills during a daily twenty-five-minute seminar covering the curriculum and every content area. Results at Joliet West echo the findings of Johnson and Johnson's meta-analysis (1981) that “instruction that focused on cooperation and collaboration resulted in significant gains in the achievement, self-esteem, and social development.” Since implementing the program in January 1988, Joliet West has seen a significant decrease in failure rate and referral rate; there has also been an improvement in grade point average for at-risk students.

Joliet West High School has data documenting improvement in grades and in reading attitudes, as well as a significant decrease in failure rate and referral rate. A compilation of student and teacher comments indicate the cooperative difference.

Among the students' comments were:

“I love to work in groups. It helps you to learn that your answers aren't always the best...”

“It gives you the feeling that you are safe and that whenever you are in need there will always be someone or somebody to help you. I learned that sharing was a big deal and we can learn to trust each other...”

“One skill I have developed is sharing—I never shared before...”

“Working in groups really changed me—I learned to connect with someone else and get along with them—I learned to disagree and to solve that disagreement...”

Among teachers' comments were:

“For the first time in more than twenty years of teaching, my freshmen didn't complain when I assigned them to softball teams.”—a gym teacher

“After two students role-played a situation in study skills seminar, the rest of the class burst into spontaneous applause. Talk about encouraging one another to participate!”—an earth science teacher

"A student was to be moved from regular classes to special education classes. At the staffing, the father requested that his son remain in freshman seminar because for the first time in his high school career the young man felt he had made some friends because of his work in a cooperative learning group."—a guidance counselor

"In freshman seminar my students are forming their own groups to study before major tests. They quiz each other. They enjoy working together so much; they have even made up their own games and asked me to be part of their group."—a special education teacher

The more I see high school teachers using cooperative learning, the more I find that cooperative learning is resulting in higher achievement; greater use of higher-level reasoning; more positive heterogeneous relationships; better attitudes toward school and teachers; and true integration of cultures, minorities, and mainstreamed special education students. I also see, as in all the cases I have noted, that individual grades increase. This is not "grade inflation" as doubters often assert; it is an increase in the success rate. This is one more indication that cooperative learning is turning around the results in the high school classroom. Bs and As become the norm.

IN THE CLASSROOM: THE BASE GROUP PHENOMENON

Beyond the in-class successes reported, there is another application of cooperative learning that holds great promise at the secondary level. I call it the *base group phenomenon*. Base groups are skillfully applied at Joliet West High School to end the isolation experienced by secondary high school students. When base group structures are built into the high school play the impact is phenomenal.

In elementary schools, a child's sense of belonging is partially created by having one primary teacher, one set of classmates, and one classroom. In high school, that sense of belonging is threatened by the constant shifting from room to room and from teacher to teacher that departmentalization requires. The only place most students can call their own is the locker.

The president of the American Federation of Teachers, Albert Shanker, presents a vivid picture

of how ludicrous it is to continue the factory-like, isolating practices that have dominated secondary education since 1900. Mr. Shanker (1990) says, "How many offices assign a worker to six different desks, in six different locations and to six different supervisors? Yet this portrays a day in the life of most secondary students. In an office you are expected to ask a co-worker for assistance; in a classroom it is called cheating."

Psychologists have demonstrated very clearly that long-term, caring, committed relationships are as important to a human being's psychological health as good nutrition and adequate sleep are to physical health. The research in this area is the oldest research in American education. There are ninety years of research and hundreds of studies that have shown conclusively that the students who are successful in life can point to at least one significant person who cared about them. *All* students need to know that there are people in the world who love them, are committed to them, and will provide help and assistance when needed (the need does not end with graduation from the eighth grade). In permanent relationships there are increased opportunities to transmit achievement-oriented values.

People who are not successful in life, who are in trouble with the law, or who live on the fringe of society say, "No one cared about me, not my parents, not my classmates, and certainly not my teachers." Prisons and mental institutions are packed, and the percentage of the population that is being incarcerated is growing. When the populations of these institutions are analyzed, it is found that the IQ of the inmates is usually above average. These groups were generally capable of learning when they were in school. The results of this body of research leave no doubt as to the importance of structuring a classroom for caring, interactive relationships.

Enter cooperative learning. The cooperative learning teacher creates activities that build group cohesion. By structuring base groups which stay together at least as long as the semester and sometimes the year, students have a place where they are needed and wanted. Receiving social support and being held accountable for appropriate behavior

by peers who care and who have long-term commitment toward each other's success and well-being are important aspects of growing up and progressing successfully through school. The longer the group works together, the more cohesive and more powerful it becomes. *Everyone* "belongs" in his or her base group.

In an increasingly mobile society, one of the most traumatic experiences for an adolescent is to leave friends and transfer to a new school. Even in adulthood, the pain of remembering that experience from the high school years is vivid. The cooperative classroom provides for departing and for the new student by the care and concern expressed by base group members. Group members are taught social skills and are expected to take care of each other. The archaic values of working alone and not sharing are replaced with the positive interdependence which is so necessary for success in a workplace and in life itself. Students are taught how and are expected to take care of each other. Cooperative learning group members take care of absentees and even forgotten books and pencils are turned over to the group.

Base groups are a primary means of creating permanent relationships within the school. They are developed with the realization that students need each other's support and the skills to relate to each other in an honest and effective manner. These groups are long-term, heterogeneous, with stable membership whose primary responsibility is to provide encouragement, support, and assistance. They continue for at least a semester or a year and preferably for four years.

Beyond what base groups do to help students form stronger connections to the school, these same groups help high school students deal with increased cultural diversity, literacy, and workplace skills. The more rapidly these social pressures intensify, the more important it will be for secondary schools to use cooperative learning to prepare students for the world after school.

Cultural Diversity

Base groups structured to build on diversity can help students integrate cultures, races, and the disabled much more easily than any legislation. A

three-year study of the base group phenomenon was conducted in a Los Angeles high school. Students who previously segregated themselves formed associations that integrated races and cultures as a result of cooperative learning classrooms. These students are recognizing that there are different viable ways of life and are being prepared to recognize the worth, the value, and the dignity of every human being. No longer are these high school students assuming that their own practices, beliefs, and standards are superior to those in other cultural and social structures.

Literacy

A quantum leap in expectation has ushered in a new age in American education. The standard used just a century ago to judge whether or not Americans were literate was a person's ability to sign his or her name. Fifty years ago, in the era of World War II, the measure was reading at a fourth grade level, and twenty-five years ago, the frequently used standard of the War on Poverty era was an eighth grade reading level. The 1986 assessment to profile young adult literacy defined it as the ability to "use printed and written information to function in society, to achieve one's goals, and to develop one's knowledge and potential." Formerly, everyone was subjected to an education where the standards for ultimate success would have best suited the achiever to be a college professor.

The amount of information in the world is doubling every eighteen months (Cook, 1988). A fully functioning person must face the enormous task of managing data and the learning environment. Technology has brought a knowledge explosion and an information-rich world. This is a new world—the world of technology, the post-industrial age, the information age. Problem solving and creativity are vital basics to accommodate and transform all this new information into meaningful knowledge and wisdom. Otherwise one becomes enslaved by the results of the technological advances. Product-oriented teaching and assessment must be replaced by process-oriented education. Although there is no made-to-order solution to these challenges, cooperative learning provides the foundation for maximizing student achievement,

critical thinking, higher-level reasoning, and engagement in intellectual conflict.

THE WORKPLACE

Today the nation's concern with education appropriately encompasses all areas of learning with the glare of attention focusing on the workplace. The lines between workers, supervisors, and managers become blurred as "working in teams" or "quality circles" raise creativity and productivity. The team members put their hands together and solve problems.

In 1984, the National Academy of Science published *High Schools and the Changing Workplace: The Employers' View*. Composed primarily of employers, this study group concluded that the critical core competencies "include the ability to read, write, reason, and compute; an understanding of American social and economic life; a knowledge of the basic principles of the physical and biological sciences; *experience with cooperation and conflict resolution in groups*; and possession of attitudes and personal habits that make for a dependable, responsible, adaptable, and informed worker and citizen."

The basics in preparing students for the 1990s and beyond have become the collaborative and problem-solving skills of the workplace. In contacting local divisions of several major industries concerning what industries want from graduates, the response was that they consider the ability to work well in a team a top-priority job skill. It is not difficult to convince job-conscious teenagers that interpersonal skills can make the difference in surviving on the job. The transformation of the worker's role is indicative of the extraordinary changes in the workplace and has important consequences in the education of high school students.

Most employers today cannot compete successfully without a work force that has sound basic academic skills, but schools frequently teach isolated reading, writing, and computational skills. The use of these skills on the job will require additional proficiency in summarizing information, monitoring one's own work, and using analytical and critical thinking skills. Fifty-five percent of the time spent in communicating is spent listening, but schools offer scant instruction in oral communica-

tion and listening. Employers are "putting a premium on the ability to absorb, process, and apply new information quickly and effectively" (Barton & Kirsch, 1990). An organization's ability to succeed depends on the use of creative thinking to solve problems and overcome barriers. The ability to work cooperatively in teams is increasingly important for workplace success. Employers want employees to "have some sense of where the organization is headed and what they must do to make a contribution ... and who can assume responsibility and motivate co-workers."

The workplace basics of collaboration and problem solving are so important that companies themselves are providing interpersonal skills training programs for their employees. The initial cost of such training, they feel, is more than offset by increases in quality and production.

There comes a time when every teacher asks, "What am I teaching for?" or "What do I really want for my students?" Preparing students for entry into the real world (the job market, the armed services, or marriage) is more critical on the high school level than anywhere else in education.

In 1987, the National Alliance of Business issued *The Fourth R: Work Force Readiness*. Work force readiness, the report said, "includes thinking, reasoning, analytical, creative and problem-solving skills, and behaviors such as reliability, responsibility, and responsiveness to change."

Training America: Strategies for the Nation (Carnevale & Johnston, 1989) concluded that team members will need "high levels of interpersonal teamwork, negotiation, and organizational skills—skills that enhance group effectiveness—as well as leadership skills."

Workplace Basics: The Skills Employers Want, (Carnevale et al., 1988) was issued by the U.S. Department of Labor. This document summarized the basic skills as Learning to Learn; Communication: Listening and Oral Communication; Creative Thinking/Problem Solving; Interpersonal Negotiation/Teamwork; Self-Esteem/Goal Setting; Motivation/Personal and Career Development; and Organizational Effectiveness/Leadership.

Formal education and literacy are important considerations, but most employers believe that

there will be a deficiency in workplace functioning if a young person can deal well with print, but does not listen carefully to instruction, lacks personal discipline, and fails to function successfully in group efforts.

THORNTON FRACTIONAL EDUCATIONAL COOPERATIVE

There are no quick fixes for successful educational change. Any comprehensive program requires three to five years for staff development and implementation. Cooperative learning is no exception.

High School District 215 and the feeder elementary districts of Thornton Fractional Educational Cooperative adopted a five-year strategic plan beginning in 1989 to become cooperative schools. Year one focused on awareness sessions for administrators, teachers, and school board members at the annual Township Institute, administrators' monthly seminars and the annual summer Professional Development Institute. The focus was research-based basic elements of cooperative learning and classroom strategies. In year two, representative superintendents, teachers, and every elementary and secondary building administrator completed thirty hours of basic training in the Johnson model by participating in four-day sessions with certified trainers from the Illinois Renewal Institute. In the summer of year two, K-12 teachers and administrators completed thirty hours of advanced training. Every building administrator participated in a four-day workshop conducted by Roger and David Johnson on "Leading the Cooperative School."

Concurrent basic training is offered each year of the plan for untrained teachers. The fourth year of the plan will focus on the Illinois Renewal Institute model for *Blueprints for Thinking in the Cooperative Classroom* for teachers who have completed the basic and advanced Johnson training. Dr. Arthur Costa will present awareness sessions on metacognition and "Teaching for Intelligent Behaviors" for representative teachers and administrators.

CONCLUSION

Veteran teachers and administrators from Thornton Fractional, Wilmington, and Joliet high school districts are celebrating their successes and collaboration as teams. Cooperative learning in the classroom leads to a collaborative school. It becomes the norm for teachers to work as teams of professionals, modeling cooperative learning, using the very problem-solving strategies, positive interdependence, face-to-face interaction, group processing, and social skills which make education alive and real. Formerly, teachers in the high school taught independently of one another even when teaching the same subject area. Professional support groups are forming with positive interdependence and collaboration taking hold.

In District 215 and the feeder elementary schools, we believe there is no choice. The future is now for the high school classroom. We must have the cooperative learning model. Face-to-face interaction, heterogeneous interactive groups, the practice of collaborative and social skills, positive interdependence, higher-order thinking, and individual accountability must permeate the high school classroom and become its central focus.

REFERENCES

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- | | |
|--|---|
| <p>Barton, P., & Kirsch, I. (1990). <i>Workplace competencies: The need to improve literacy and employment readiness</i>. (Policy Perspective Series; Office of Education Research and Improvement) Washington, D.C.: U.S. Government Printing Office.</p> | <p>Bellanca, J., & Fogarty, R. (1990). <i>Blueprints for thinking in the cooperative classroom</i>. Palatine, IL: Skylight Publishing, Inc.</p> |
| | <p>Bellanca, J., & Fogarty, R. (1986). <i>Future world, future school</i>. Palatine, IL: Skylight.</p> |

- Carnevale, A., & Johnston, J. (1989). *Training America: Strategies for the nation*. Alexandria, VA: American Society for Training and Development.
- Carnevale, A., Gainer, L., & Meltzer, A. (1988). *Workplace basics: The skills employers want*. Alexandria, VA: American Society for Training and Development.
- Cook, B. (1988). *Video learner's guide for Bill Cook's strategic planning for America's schools*. Montgomery, AL: Cambridge Management Group.
- Goodlad, J. I. (1984). *A place called school*. New York: McGraw Hill.
- Johnson, D., & Johnson, R. (1989). *Leading the cooperative school*. Edina, MN: Interaction Book Company.
- Johnson, D., & Johnson, R. (1989, December). Why use cooperative base groups? *The Cooperative Link*, p. 1.
- Johnson, D., & Johnson, R. (1988). *Cooperative classrooms, cooperative schools*. Unpublished manuscript, University of Minnesota.
- Johnson, D., Johnson, R., & Johnson Holubec, E. (1990). *Cooperation in the classroom*. Edina, MN: Interaction Book Company.
- Johnson, D., Maruyama, G., Johnson, R., Nelson, D., & Skon, L. (1981). Effects of cooperative, competitive, and individualistic goal structures on achievement: A meta-analysis. *Psychological Bulletin*, 89, 47-62.
- National Academy of Science. (1984). *High schools and the changing workplace: The employer's view*. Ann Arbor, MI: Books On Demand.
- National Alliance of Business. (1987). *The fourth R: Work force readiness*. Washington, DC: Author.
- Ouchi, W. (1982). *Theory Z: How American business can meet the Japanese challenge*. New York: Avon Books.
- Shanker, A. (1990, February). Speech given at the Thornton Fractional Township Institute. Calumet City, IL.
- Shanker, A. (1989, March). The case for restructuring our schools. Speech given for the Association for Supervision and Curriculum Development; San Antonio, TX.
- Slavin, R. (1987, November). Cooperative learning and the cooperative school. *Educational Leadership*, pp. 7-13.

COOPERATIVE LEARNING: A NATURAL WAY TO LEARN

David Schumaker

It was early morning. The surf pounded a foggy beach near Monterey, California. Seventeen students stood shivering in the early morning, watching as a pick-up truck rumbled up and a somewhat grumpy professor stepped out. Even though it was his class and his field trip he seemed to us to be upset, as if it was a great inconvenience to be out so early. We gathered around him expecting instructions, a hand-out, perhaps a set of worksheets to guide us as we studied a sandy beach. As members of a marine ecology class we knew we were here to do a beach transect, to learn all we could about this small part of Monterey Bay. Much to our surprise, instead of instructions from the professor, we heard simply, "Well, get to work!"

We looked at each other. Some of us laughed. "What are we supposed to do?" someone asked.

He responded, "All of you know you are supposed to complete a transect of this beach. The instructions are in your books and we have discussed it in class. My problem was thinking up this assignment and getting all the stuff you need into the pick-up. Your problem is getting organized, figuring out what to do with it, and how you are going to help each other with the job before the tide comes in."

I was upset! He was being paid to "teach." We were paying to be taught! This man seemed to us to be derelict in his duties. We spent the next ten minutes complaining and whining while he strolled along the shore.

Eventually we realized that if we were going to get the job done we had better get to work. The professor obviously was not going to help. Soon we divided into teams, one for each beach zone, and assigned each team member a job. Some looked up the chapter on beach transects; another collected stakes, buckets, nets, and all the equipment the team needed for the job. Recorders took out notebooks and sharpened pencils while other people drove stakes in the sand and measured out plots to be studied. We worked quickly because we knew that the tide would soon turn and the beach would be covered with sea water.

All the time the professor strolled back and forth asking questions such as, "What do you suppose you have there?" and "Did that come from zone one or two?"

At the end of the day, as we gathered around the truck, compared notes, and discussed the experiment with the professor, I began to realize how much I had learned in a very short time and how

deeply I was beginning to understand the zone we had examined.

I have often thought of that day. I never forgot that lesson. I have forgotten many others from less inspiring teachers—who based their teaching on having us memorize large collections of facts they spewed out from the lectern in the front of a room. There are, of course, some facts that I do not recall from that day, but all I have to do is wander back to the beach at low tide, poke around for a few moments, and it all comes back to me. It was my first experience with cooperative learning.

Years later, as a biology teacher, I often used the same method I participated in that day. Many of my students grumbled and complained that I was the teacher and I should teach them. They felt they were supposed to listen and learn. With patience they soon were working constructively as I strolled among them asking questions.

COOPERATIVE LEARNING — A NATURAL WAY TO LEARN

Humankind has most likely been working cooperatively ever since it became *Homo sapiens*. Still, even though almost every business has its employees working together and even though we look for ways to spend time together socially, we tend to force our students to work alone in the classroom. The only place where people are asked to work alone in a competitive atmosphere on a regular basis is in the classroom.

The brain likes to work on automatic pilot. This becomes a major problem that teachers must overcome. John H. Clarke states, "How much of the school day can be managed on automatic pilot? Paradoxically, the same school walls built to protect learning can also seal off students from compelling reasons to learn. Under normal conditions, students may see no need to direct the work of their minds to fit the purpose of schooling." (Clarke, 1990)

Cooperative learning is an effective method for jogging students off "autopilot." Research demonstrates that cooperative learning in non-com-

petitive teams is a far superior method of learning for most students than either competitive or individualized methods (Johnson, Maruyama, Johnson, Nelson, & Skon, 1981). Most teaching today fails to take into account students' individual learning styles and multiple intelligences, or the damage done to those who lose in competitive classrooms.

Many teachers today know something about cooperative learning. Elizabeth Cohen, from Stanford University, says that cooperative learning is fairly widespread, a common method of teaching in many situations (Cohen, 1990). But many teachers have had little or no training in this method, or assume they know what it is just by hearing its name.

Recently I was confronted by a teacher who said, "I already know how to use cooperative learning. I have my students work in groups often." The teacher went on, "I don't think that it really works: usually the best student in the group does all the work while the others copy." Unfortunately, these people are missing the point and setting the stage for failure. Cooperative learning is much more than "group work." It is a highly structured and intricate process and—when used correctly—a powerful tool.

COOPERATIVE LEARNING MODEL

There are many successful models of cooperative learning developed or taught by people such as Roger and David Johnson, Spencer Kagan, Robert Slavin, Elizabeth Cohen, and Dee Dishon and Pat Wilson O'Leary. Most of their models, however, include similar components, as illustrated in Figure 1.

Positive interdependence refers to the group having a feeling that its members will "sink or swim together" as Roger and David Johnson would put it (Johnson & Johnson, 1988). **Individual responsibility** to the team is interwoven with the responsibilities of other members of the group, usually by assigned roles or duties. If one person fails to complete an assigned task, the entire group suffers in some way, usually by receiving a low team grade.

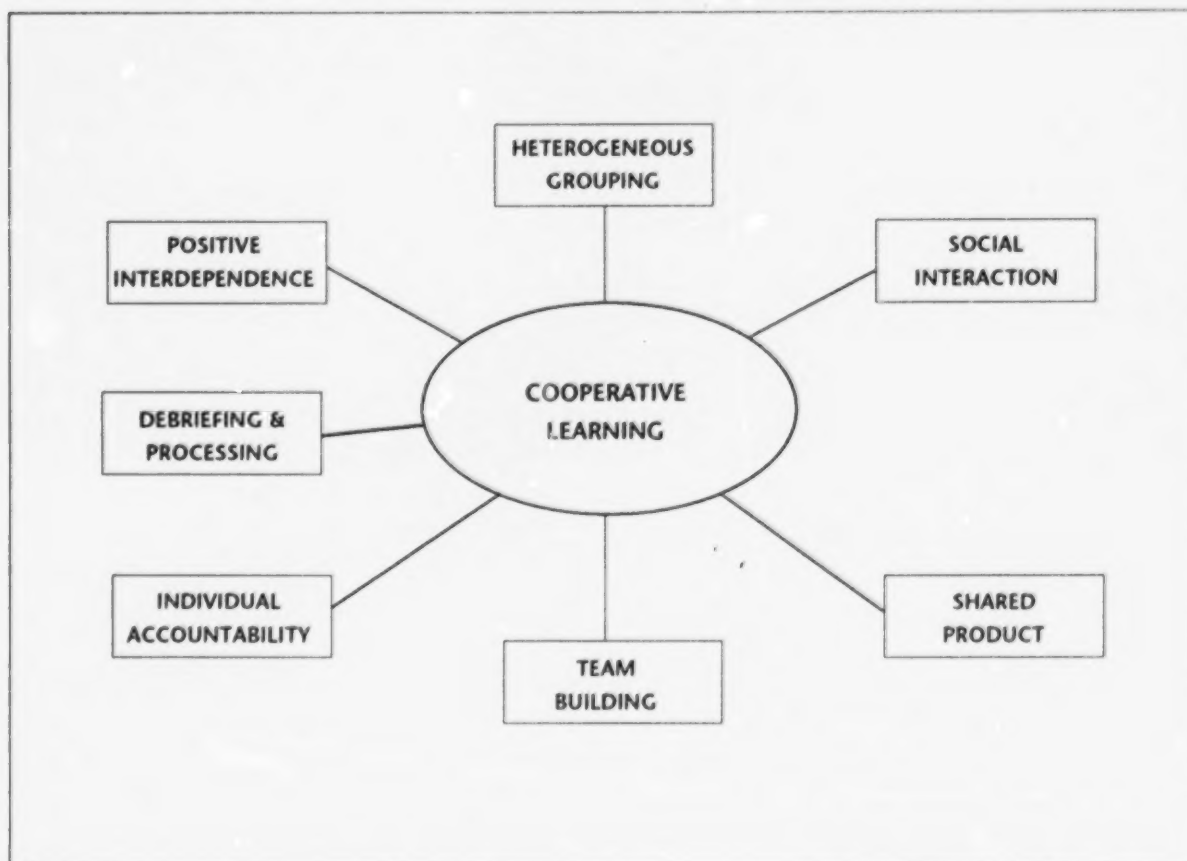


Figure 1 Cooperative Learning Model

The cooperative groups are built **heterogeneously**, with each group having students who represent the general make-up of the class. These groups then take part in **team-building** activities that help to bond the students together into a cohesive unit. At this point, depending on the experience of the group, the instructor may have to help the students develop the specific **social skills** that will be necessary for the group to function efficiently.

In most cases there should be some form of **shared product** produced by the group. This product is then shared with the other students in the class or turned in to the instructor.

Finally, when the work is completed, the entire class **debriefs and processes** the experience. This is a key component, in which the students and the

instructor look closely at the entire process and evaluate how well they did. I find that at this point all participants learn how to improve the experience in the future and set the entire lesson in their minds. My classroom motto is, "None of us is as smart as all of us" and nowhere is this more evident than at this point, as my students solve problems and show me how to improve the methods of cooperative learning and the lesson next time.

LESSON DESIGN

Cooperative learning is not "kick-back" teaching, in which students work in groups while the teacher grades papers in the back of the room. It is a highly structured teaching method that requires careful planning and intense supervision by the teacher

while it is in process. Success will depend on thorough preliminary planning just like any other method. After deciding on the basic structure of the lesson, the instructor must design the activity, keeping criteria for learning in mind.

The activity should follow good learning theory. Benjamin Bloom, Hilda Taba, and others have shown that we learn by processing information in stages (Costa, 1985). Art Costa breaks this learning process into four simple categories. These categories are: input, processing, output, and metacognition (Costa & Lowery, 1989).

Objective

The purpose of the activity must be clear in the mind of the instructor if it is ever to become clear to the student. This is often the most difficult part of the process. The objective should be written down and shared with the students at the beginning of the activity. For example:

- At the end of this activity you will be able to explain the difference between igneous, metamorphic, and sedimentary rocks and summarize how they are formed.
- By the end of this group activity you will demonstrate how to employ group problem-solving strategies by ...

Activity

Input If the brain is going to think about something, it must have the data to think with. This phase of learning uses all of the senses to take in the information that forms a knowledge base, a reference section of new information in the brain, for later use during more involved processes of learning. Research indicates that most instructors spend most of their teaching time on the input phase, typified by direct instruction which leaves the student in a passive learning phase. The student usually finds this time the most boring (Gall, 1984).

An example of an input activity about the three classes of rocks—igneous, metamorphic, and sedimentary—would be to assemble three piles of rocks on tables in the room, each pile containing rocks that represent one of the three classes of rocks and some books about rocks available for student use.

Teams of students would have to discover, by direct observation and the use of books, the qualities of each of the rocks in each of the piles and record their findings in their notebooks. The students would decide how this record would look.

Activities at this level are built around cognitive behaviors such as naming, describing, matching, listing, and recalling (Costa et al., 1989). This activity would be the foundation for the next.

Processing Once students have learned background knowledge, they can then begin to do something with the information in order to make it meaningful and commit it to long-term memory. First, for example, I would have students look for the similarities of the rocks in each pile and what makes them different from the rocks in the other piles. I would then ask the students to organize the rock types into a sequence that forms a cycle and to explain how one rock type could become another.

As you can see, the instructor designs this activity to encourage students to draw relationships or synthesize the data learned in the previous activity. This portion of the learning process becomes more stimulating for the student. Activities at this level are built around cognitive behaviors such as comparing and contrasting, explaining, making analogies, organizing, and inferring (Costa & Lowery, 1989).

Output The next activity allows students to apply the new knowledge and thus demonstrate that they truly understand the concept. I would have the team attempt to classify an unknown rock that had previously not been available to the students. I would ask them to make decisions about how it was formed and what it could become if it was treated to high pressure and intense heat. At this point, the student is working with such cognitive behaviors as generalizing, predicting, evaluating, hypothesizing, and speculating (Costa & Lowery, 1989).

Metacognition Along the way, I would encourage the students to stop and think about their answers. Students should attempt to see how they thought about the problems and decide if their reasoning is sound. The instructor should first model this behavior and structure it for the class. Having one student verbally recapitulate the pathway the

group followed during the activity while others listen and react helps to focus the group on their reasoning.

As an example, here's how a student might "metacogitate" about a decision to place an unknown sample of rock with sedimentary rocks:

Let's see, we know from the book that sedimentary rocks are made up of particles that are cemented together. The unknown sample seems to be made of particles, although they are quite small. (We know because we looked at the rock with a hand lens.) We also know that sedimentary rocks often are softer than metamorphic or igneous rocks, and when we scratched the unknown rock with a coin or a fingernail, we could see small particles sprinkling off the sample. Therefore, we feel that the unknown sample is some kind of sedimentary rock. Does everyone agree?

If a team member does not follow the thinking or does not agree with the conclusion he or she may want to paraphrase the first student's statement and show where he or she thinks the thinking process strayed (Costa & Lowery, 1989).

This is not an easy process for many students. Because students usually are not asked to work in such a way, it takes time to bring them to a point where they can think about their thinking out loud.

Product As a final activity for the team I usually have them prepare some form of a product that may be shared with the rest of the class or each member of the team. These products might include briefing papers, posters, lab reports, oral reports, or individual writing assignments.

Figure 2 is a guide that I have developed to help the teacher plan a cooperative learning activity. It is based on Arthur Costa's input, processing, and output design (Costa, 1985). The method can also be used to plan any lesson.

SETTING THE STAGE FOR COOPERATIVE LEARNING

Each year I start teaching by preparing my classes for cooperative learning from the very first day. As the students come into my classroom they must

find their assigned seats by looking at a projected seating chart. The chart is written so that it represents the room from the teacher's viewpoint. Projected onto a screen it appears to be reversed, and, unless students are especially observant and examine the chart carefully, they inevitably sit in the wrong seats. I learned this technique from Harry Wong, a teacher trainer from the San Francisco Bay area.

As soon as the bell rings, I introduce myself and explain the process of "Think Aloud Problem Solving," or, as I prefer to call it, "Pairs Problem Solving" (Whimbey & Lochhead, 1982). Each student is a member of a two-person "thinking team." When approaching a problem that needs solving, one member becomes the problem solver and the other the listener. The rules are:

- The problem solver talks aloud about a problem and explains how he or she would solve it, step-by-step, verbally expressing all of the thoughts that come to mind during the process.
- The listener listens and makes certain that he or she understands the solver's reasoning. If the solver becomes quiet, then the listener reminds the solver that he or she must continue thinking aloud.

The members of each teacher-assigned pair think through the seating assignment—on the floor and on the chart—and then come to an agreement as to whether they are sitting in the correct seats. Then I provide time for the students to rearrange themselves. At this point I inform them that this team of two forms the basic cooperative unit for thinking. I say to them, "You are teamed with your thinking buddy. This is a person you will work with for the first grading period as a thinking partner."

Thinking buddies are an integral part of my classes. Many times during a period I ask questions or make statements and then direct the class to "turn to your thinking buddy and talk about this."

I often have students work on homework assignments as pairs of thinking buddy teams. For example, I rarely give a reading assignment from

COOPERATIVE LEARNING ACTIVITY PLANNER

Some basics to remember:

- Students must have time to develop **input** or basic information if they are to be able to work effectively.
- After the students have collected the basic facts, they must then manipulate those facts so as to make sense of them. They must have time to **process** the information.
- Finally the students must use the information to complete an **output** activity. At this point I find it important for the students to produce a product, such as a poster or paper.

Step I

State the topic of this activity.

Step II

Clearly state the basic concept or outcome that you want the student to understand as a result of this activity.

Step III

Design at least three input questions students should answer in order to build a body of background information for the activity, or design several input activities so students can investigate background information.

Step IV

Develop one or two processing activities that give the students time to work with the input information in order to truly understand it. During this activity students might find they need to seek more input information or that they need more time or more reference materials to complete the activity.

Step V

Define an output activity and a product the students will complete to use the new concept. This activity should allow the students to apply the information in some new way that is not just a repetition of previously learned material. A product of some kind should be made to share with the rest of the class.

Organization

Number of days needed to complete the activity:

Team size: _____ (2, 3, 4, 5, etc.)

Duties of each team member (e.g., timer, reporter, recorder, etc.):

Materials needed for each team (you may want the students to participate in the decision on materials needed):

Team-building activity:

Specific instructions for the students:

Debriefing questions:

Figure 2 Cooperative Learning Activity Planner

the textbook by page number. Instead I ask students to find out about a specific topic and mind-map all they can find out about the assigned subject (Buzan, 1976). A mind-map is a highly structured method of note taking or outlining. (Figure 1 is a simple example.) They may use any acceptable book. We previously agree on what "acceptable books" are, and on the requirement that

they provide a bibliographic citation for the reference. This way a student can use either the textbook or any other reference.

The following day, as the students enter the room, they find large sheets of butcher paper and felt pens on the tables in the room. I ask them to sit with their thinking buddies and then to get together with one other thinking team. I then assign

SAMPLE COOPERATIVE LEARNING ACTIVITY

Lost In Mexico

This example I developed for a Spanish teacher who felt that there was no way that cooperative learning could be used in a foreign language class beyond practice teams.

A commercial airliner carrying a group of American tourists, none of whom can speak any Spanish, is flying over a remote portion of central Mexico. It has a problem and crash lands. All the people survive although some are injured.

In the airplane seat-pocket is a survival guide—with twenty-five Spanish words and their definitions—to be used in the event of an emergency. These words are all the survivors have to communicate with a group of native Mexican people who speak no English. The survivors must be able to communicate their own needs, the needs of the injured, and aid in the rescue using only the twenty-five words on the card. What words would you choose and why?

This activity is done in teams of five. Each team presents its list of words and its reasons for choosing them. The class then selects the final twenty-five words and acts out the situation.

Figure 3 "Lost in Mexico" Cooperative Learning Activity

them to compare their mind-maps and develop on the butcher paper a large mind-map that combines all the items discovered by each team member from their reading. After this activity is completed each team posts its large map on the wall and explains it to the class.

The teacher structures the activity of explaining the map to the class. All team members come to the front of the class and stand by their map. I then ask one student to explain a portion of the map that I select. This way each member of the team must understand the entire map and be able to demonstrate having learned what the other team members have discovered.

At the end of the activity we leave the maps up around the room for all to see during the time we are working with that subject. There is usually a tremendous amount of material, far beyond a simple "read from page 29-36 and take notes" style of assignment that many teachers give.

In order to support the process of cooperative learning, I have four class rules:

1. Everyone participates.
2. There is no such thing as the simple statement, "I don't know!" It is acceptable to say, "I don't know, but I will find out and here is how...!"

3. Follow directions.

4. Everyone deserves your respect until they earn your disrespect.

From the simple two-person teams I then develop larger teams, usually in small increments, for various learning activities. (See Figures 3 to 6 for sample cooperative learning activities.) I prefer to use teams of three, five, or seven. My favorites are a team of five for young students and a team of three for adults. There are many arguments among the experts about how many students should make up a team. Some, like Elizabeth Cohen of Stanford University, say five is the best number, while others prefer four to seven (Cohen, 1986).

At the end of the activity I call the student teams to the front of the room to present their findings to the class. I usually have them sit in chairs provided with their poster or overhead presented so the class can see it. At that time I begin to ask different students to explain various portions of assignment. I do not let them choose. This prevents a student from only learning one small part of the entire project. Everyone must understand all that the team accomplished and be able to explain it to the entire class.

I encourage students in the class to ask the team questions and challenge their findings. The team must try to find answers for the class questions.

SAMPLE COOPERATIVE LEARNING ACTIVITY

Rockets to Pluto

The following is an example of a culminating activity following a unit on the history of the development of navigation. The students had studied and experimented with the various methods of navigating on the earth. This example follows the planning outline explained previously.

You will work in teams of five or less today. The person with the longest first name will be the team leader. If a tie occurs, then the person with the longest first name and the longest pencil will be the leader.

Each team must agree on who will be the recorder (although everyone is responsible for keeping private notes), the procurer, the timer/prompter, the reporter, and the communicator. (The communicator is the only member of the group who can ask questions of the teacher.) The team must agree on each answer before the recorder writes the answer. Remember, you will be held to the time limits.

Task #1 (5 minutes)

Make a list of all the navigational aids that your group can think of and state the function of each.

Task #2 (3 minutes)

Organize your list from the oldest navigational aid to the newest.

Task #3 (10 minutes)

How could you use the navigational aids that you listed to determine latitude and longitude? Be precise. If you discover that you need more aids, add them to your list.

Task #4 (10 minutes)

Using the following format, make a list of five differences between navigation on earth and navigation in space.

Earth	Space
1. _____	_____
2. _____	_____

Task #5 (15 minutes)

What do you consider to be three major problems dealing with navigation between points in space? Why are they problems?

When you reach this point please inform the teacher. We will pause to discuss what each team has discovered with the entire class.

Task #6 (30 minutes)

Devise a method of space navigation to find your way from the Earth to the planet Pluto and back. Assume that all teams have the same rocket ship and the trip will take twenty years to complete, ten to get there and ten to return. Be sure to account for the many different problems of space navigation you have discovered and demonstrate how you would overcome them.

You must produce something to explain your team's solution to the class. Posters, handouts, or overhead transparencies are all examples of how this could be accomplished.

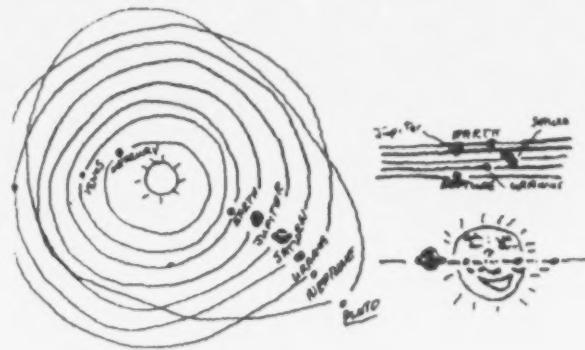
Task #7 (Homework)

How would you navigate between galaxies and what would be the major problems you would need to overcome?

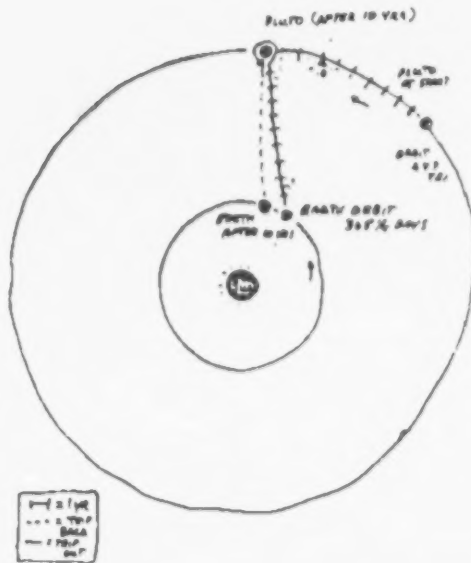
Figure 4 "Rockets to Pluto" Cooperative Learning Activity

STUDENT SOLUTIONS TO "ROCKETS TO PLUTO" ACTIVITY

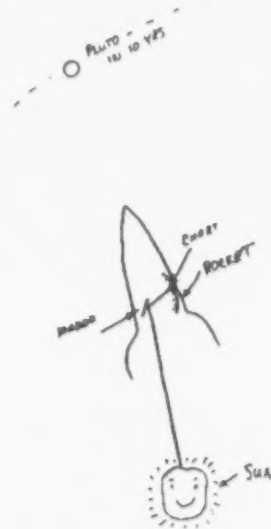
These diagrams are done by students and represent solutions to the problem of navigation to the planet Pluto and back. They were made from overhead transparencies that the students drew and presented in front of the class.



(I call this the rowboat method.) The spaceship would be guided by looking back at the configuration of the planets on any given day. A computer model would predict where the planets should be if the ship was on course for Pluto.



The sun would shine through a lens and reflect off a mirror projecting its image on a chart. The image would correspond to the rocket ship's location in the solar system and thus trace the ship's path along the chart toward the planet's predicted position at arrival time.



This method would be based on sighting the planet and determining the angle formed by a line drawn from the planet that intersected the path of the ship. The principle is that as the space ship moves along toward the predicted spot where the planet and the space ship will meet, the angle will become predictably smaller.

Figure 5 "Rockets to Pluto" Activity Solutions

SAMPLE COOPERATIVE LEARNING ACTIVITY

Capitola Beach Murder

It is often difficult to get students to listen to each other. The following activity is designed to encourage and demonstrate the importance of listening to others.

Students love to solve puzzles and I have found that students love to solve the following mystery written by three teachers (Peggy Marketello, Susan Nerton, and Joanne Roster) for use with cooperative teams of up to fifteen students.

Rules and instructions:

1. The team sits in a circle facing inward.
2. Each team member receives one or more clues.
3. One team member may not show written clues to another.
4. All clues must be communicated verbally.
5. The first team to accurately solve the crime wins.
6. You may organize your team any way you wish.

Mystery

A murder has been committed. Each of you has investigated the crime scene and has discovered one or more clues. You have been assigned to a team of detectives to solve the crime. You must determine who was the victim, who is the killer, and the motive.

Clues:

- Ben Allison owed Mrs. Singleton three months' back rent for a house in Soquel and planned to borrow a large sum of money from her.
- Charles Lentil was despondent over his girlfriend's dating of a married man.
- Mrs. Allison received a telephone call from a woman telling her of her husband's affair with another woman.
- Mrs. Singleton's gardener told her he would have the yard cleaned of debris, bagged, and taken away before the Clarkes arrived.
- Tuesday, Charles Lentil was arrested on the beach for littering. He decided to leave town the next morning.
- Tuesday, early, Mr. and Mrs. Clarke drove down from San Francisco to console their daughter who had called them.
- On the drive from San Francisco to Capitola, Mr. Clarke stopped at his son's shop eleven miles from Santa Cruz.
- Wednesday, 7:00 p.m., Mrs. Clarke drove her daughter to Dominican Hospital after she collapsed with a nervous breakdown.
- The hospital nurse gave Mrs. Allison a sedative for sleeping, while her worried mother sat in a chair by her bed for the evening. At midnight, the nurse gave Mrs. Allison and her mother another sedative.
- Ben Allison told his father-in-law he was filing for divorce.
- Mrs. Singleton rented a beach house on the cliffs overlooking Capitola Beach to Mrs. Allison's parents the day they arrived.

Figure 6 "Capitola Beach Murder" Cooperative Learning Activity

SAMPLE COOPERATIVE LEARNING ACTIVITY (continued)

Clues: (continued)

- The police pathologist reported that the body had been dead for twenty-four hours.
- No water was found in the dead man's lungs but there was a penetration above the left eye of the corpse and at the back of the head.
- Oct. 10th, 7:00 a.m. Mrs. Ben Allison reported to police that her husband was missing because his bed had not been slept in.
- 8:15 p.m., Thursday, Oct. 10th, a man's body was discovered on the shoreline of Capitola Beach.
- Martha Wood's neighbor, Lana Watch, told police she recognized the dead man from the newspaper picture as having been a frequent visitor to Martha's house on Old San Jose Road.
- Martha said Ben left her house at 7:45 to keep an 8:00 appointment.
- Ben Allison wanted to buy his brother-in-law's gunsmith shop in Davenport.
- A 22-caliber shell was found in the sand beneath the cliffs of Capitola Beach.
- Lana Watch, disabled in a recent car accident, was an ex-girlfriend of Ben Allison's.
- A surfer had seen a man dump a large bag in the water and called police.
- Martha admitted to police that she had had a quarrel with Ben on the evening of October 9th.

Figure 6 (continued)

The activity follows the input/process/output model and requires the students to understand what they know in order to predict possible answers to the final activity.

Test Taking

I often use cooperative teams to help students study for tests. I have the class brainstorm possible questions for the test and look at what we have been going over since the previous one. I give them some time to organize for the studying and I inform them that, beyond the individual grade they will earn on the test, they will receive a combined grade that is the average of the entire team's scores. On the day of the test I allow the team to discuss the test for ten minutes before the team members must work alone.

MISUSE OF COOPERATIVE LEARNING

In the movie *Teachers* there is a teacher named Ditto who sits in the back of the room reading the newspaper while his students face the other way and work

quietly on their ditto sheets. He points out to anyone who criticizes him that he has received the award for the quietest classroom. One day he dies and no one notices his death for several periods.

Cooperative learning does not free you to be like Ditto. There are several things that cooperative learning is not. It is not a way to have students work while the teacher sits back and grades papers. Cooperative learning will fail if the teacher treats it as an activity that can run without direction and teacher involvement. During the time students are working, the teacher must move around and monitor the activity. He or she should be determining if the activity is achieving its goals and collecting data for feedback during the debriefing at the end of the activity.

Problems occur when the teacher does not design activities so that every group member has an active part which contributes to the whole. When this happens one person may end up doing all the work (usually the one most concerned about a grade). The others learn *nothing* yet earn the same credit for the activity.

Another common misunderstanding is that cooperative learning is easier to manage than other teaching methods. I find that planning and organizing a cooperative learning activity takes considerable time and effort. Without the proper preparation, cooperative learning will fail; the students will become frustrated and learn to hate the activity. With the proper planning, they will grow to see the value of the experience. Stanford University was hired by the Packard Foundation to evaluate a program I was teaching that depended heavily on cooperative learning as a teaching method. A team of evaluators interviewed my students at the beginning of the year and at the end. The students were asked their feelings about cooperative learning. They reported at the beginning that it was "stupid" and that "the teacher should teach." By the end of the year, however, they reported it was "exciting," that they could learn more about a subject, and that it is the "best way to learn." This would not

have happened if they had not experienced success.

CONCLUSION

American education is good at adopting fads. As a high school teacher with over twenty-two years' experience in the classroom, I have seen many fads come and go, and, as a trainer introducing new ideas, I am often asked, "What did we used to call it?" In my experience, cooperative learning has taken hold and passed the point of being the latest fad in education. It has become a valuable tool, from the elementary school through the university—as well as in the business world.

The use of cooperative learning has greatly enhanced my teaching. Today, as a principal, cooperative learning is the main method that I use for faculty meetings and for teaching adults. I'm convinced that cooperative learning, when used properly, is a powerful tool for teaching real-life skills.

REFERENCES

- Buzan, T. (1976). *Use both sides of your brain*. New York: E. P. Dutton & Co., Inc.
- Clarke, J. H. (1990). *Patterns of thinking*. Boston: Allyn and Bacon.
- Cohen, E. G. (1990). Continuing to cooperate: prerequisites for persistence. *Phi Delta Kappan*, 72(2), 134-138.
- Cohen, E. G. (1986). *Designing groupwork, strategies for the heterogeneous classroom*. New York: Teachers College Press.
- Costa, A. (1985). *Developing minds*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Costa, A. L., & Lowery, L. F. (1989). *Techniques for teaching thinking*. Pacific Grove, CA: Midwest Publications.
- Dishon, D., & O'Leary, P. (1981). Teaching students to work in groups: Cooperative learning in the classroom. In *Structuring cooperative learning experiences in the classroom: The 1982 handbook*. Minneapolis, MN: Interaction Book Company.
- Gall, M. (1984). Synthesis of research on teachers' questioning. *Educational Leadership*, 42, 40-47.
- Johnson, D. W., & Johnson, R. T. (1988). *Cooperation in the classroom*. Edina, MN: Interaction Book Company.
- Johnson, D. W., Maruyama, G., Johnson, R., Nelson, D., & Skon, L. (1981). Effects of cooperative, competitive, and individualistic goal structures on achievement: A meta-analysis. *Psychological Bulletin*, 89(1), 47-62.
- Kagan, S. (1989). *Cooperative learning resources for teachers*. San Juan Capistrano, CA: Resources for Teachers.
- Slavin, R. E. (1986). *Using student team learning* (3rd ed.). Baltimore: Johns Hopkins University, Center for Research on Elementary and Middle Schools.
- Whimbey, A., & Lochhead, J. (1982). *Problem solving and comprehension* (3rd ed.). Philadelphia: The Franklin Institute.

LESSONS LEARNED IN A COOPERATIVE COLLEGE CLASSROOM

Martha E. Crosby and Dara Lee Howard

Great is the strength of feeble arms combined.—Homer

As we say in Hawaii, we are going to “talk story” about our first experience with cooperative learning in an undergraduate computer science course. We were invited to give a course on computer file design. This topic requires the mastery of technical concepts concerning the capacity of and retrieval from different types of files. In addition, this course includes an introduction to and use of a new programming language. Computer file design is practiced collaboratively and is learned best by hands-on experience. Thus, a traditional lecture presentation of the material may not be effective in assisting the students to master the material and develop the skills needed in a job environment. For this subject matter, a team approach in the classroom seemed a better way to implement the desired realistic environment.

We chose to try the cooperative learning format to foster the students’ opportunities for success. Cooperative learning emphasizes participant interaction similar to what is required in many computer-related careers. It also offers an opportu-

nity for peers to motivate and assist each other with the challenge of a different programming language and with learning new technical concepts. Working together gives the students a chance to bring the learning situation closer to reality.

We were aware that results from research on learning suggested that people learn best when they are actively involved in the learning process. We thought that getting the students involved with each other would increase both their learning and their motivation. As peers are sometimes better able to understand and help each other with problems, we expected that they would benefit from having each other as friendly resources. Working together could also demonstrate that they were not the only ones having trouble with the course material—a reassuring fact for many students.

Our initial experience in cooperative classroom management was hectic but productive. We began with lots of enthusiasm and no practical knowledge about the mechanics of cooperative education. After our first cooperative learning attempt, we are still enthusiastic and would like to share some of the things we learned from our experience. We are excited about the cooperative format because it worked both for us and for our students. We plan

FIGURE 1: LESSONS LEARNED

- Lesson 1: You don't have to be perfect.
- Lesson 2: Adjustment time is needed.
- Lesson 3: Interaction tempers the classroom.
- Lesson 4: Cooperative rewards are needed.
- Lesson 5: Dark clouds have silver linings.
- Lesson 6: You can structure for success.
- Lesson 7: Logistical nightmares do improve.
- Lesson 8: Support is welcomed.

Figure 1 Lessons Learned

to continue using the cooperative format in future offerings of the course as well as in other appropriate learning situations. Hopefully this report will help others avoid some of the pitfalls we encountered. We encourage you to try this approach, as we think you will like it. The knowledge gained, by both us and our students, was well worth our effort.

For clarity we have organized our view of the experience into a series of lessons (Figure 1). We usually present them from the instructors' perspective, but frequently discuss student concerns also. We hope these lessons learned demonstrate to other neophytes that the cooperative classroom

works despite the occasional problems we encountered. Figure 2 recaps the pros and cons that we found.

LESSON 1: YOU DON'T HAVE TO BE PERFECT

We put this first because, fearing failure, one may never begin. We certainly did not start out knowing much. Although we knew the meaning of cooperative learning, we learned as the course progressed. As we encountered barriers, we devised barrier bashers. Conditions may not be perfect. There

Barriers	Benefits
<i>Students</i> - trained to expect traditional formats - preferred working individually - employed so-so group skills - conditioned as passive listeners - devoted to crisis management - suspected the equity of group evaluation <i>Instructors</i> - required substantial preparation time - squeezed by too-short class period - hampered by unprepared students	<i>Students</i> - committed to the class goals - built rapport with each other - participated in "win-win" learning - wrestled with concrete problems - helped each other with stumbling blocks - asked probing questions - sampled "real work" environment - opened up to instructors <i>Instructors</i> - uncovered elusive information about learners' processes - savored students' achievements - quashed the "quiet" classroom

Figure 2 Barriers to and Benefits of Cooperative Learning

never seems to be enough time to develop a new skill; on the other hand, once developed, the skill is constantly put to use. Even though you may feel inadequately informed about cooperative learning theory, try it! Even if your colleagues are skeptical about the method, try it! The students are likely to reward you with more intelligent questions, better performance, and greater understanding of the topic.

LESSON 2: ADJUSTMENT TIME IS NEEDED

There are several facets to this adjustment. Some are related to the discipline, some to individual experience and preference.

Our first adjustment involved the learning preferences of our students. Many computer science students seem to prefer to work on their own. At the University of Hawaii, we have students who come from cultures in which educational practices are more traditional and formal than the approach we wanted to use in this class. Our Japanese and Chinese students in particular are not familiar with interactive classrooms, but typically come from educational institutions that use a formal, structured class format. In addition, computer science students have chosen to join a discipline which attracts introverted and self-sufficient people. Indeed, the results of the Myers-Briggs Type Indicator examination that we gave them showed that 70 percent of them were introverts, as compared to a 35 percent introvert to 65 percent extrovert split in the population as a whole. So we were definitely dealing with people who were conditioned by their past educational experiences and by their preferred learning styles for individual work.

Secondly, in cooperative learning, students need to use group skills. Some students may not have well-developed collaborative study or work skills. Competition had been the norm between students in a class. Cooperative learning teaches the lesson that one can win without someone else losing. This knowledge is valuable for both the educational and the professional environment.

The realization of the benefits of cooperation may develop slowly, but they do develop. From the

first, we had almost universal acceptance of the social part of group work. As the semester progressed we saw the development of an appreciation for the benefits of learning together. When we asked for feedback we received favorable and illuminating comments. For example, one student said, "We get to see how other people do things (which is great if you're totally lost)." Another comments, "I especially like the group discussion times because it helps when you are working together—you don't just get your way of doing things but others' input too. It also allows the class to become a less 'hostile' environment because there's communication between the students."

A third adjustment was in the area of class format. Lectures are the usual instructional format for most computer science and other courses taught at the university level. As the only one using a non-lecture technique, our course didn't fit with the others the students were taking. The problem came from mismatched expectations. Lectures call for listening; cooperative learning calls for active involvement. We expected their participation; they expected to listen. Some students wanted traditional lectures by the instructor. They expressed a concern that they were not learning the material. For example, one student remarked, "I guess a lot more can be learned from teaching than group work;...though group assignments may be a good idea, the group work in class is definitely wasting time." Another student wrote, "I think perhaps it would be better to set up the class in a lecture style as usual—I seem to have an easier time learning since I have notes from the lecture and can review them at home."

Our approach to encouraging adjustment was to keep an open communication line. We explained what we were doing and why. We asked for feedback early in the semester and responded to their concerns. When it was possible, we followed their recommendations. Some concerns were voiced over things that we could not change, such as the system of group grades. In these cases we explained our rationale. Even though not all the students were entirely converted to the cooperative learning format, we think the group exercises were positive experiences for all of the participants.

LESSON 3: INTERACTION TEMPER THE CLASSROOM

Both students and instructors gain from an environment that involves shared responsibility for the process of learning. In our class, several benefits accrue for the students. The improved socialization produced by constant interaction with different members of the class and with the instructors seems to loosen the students' tongues. They ask more questions of each other and of the instructors, both during designated question periods and during the instructor presentations. In a small group they can ask questions that were only partially formulated. Identifying unclear areas is vital to making sense of a new topic. Most people have difficulty in sharing these areas of ignorance even among friends. In our class, students met and grew to trust each other by working together.

Familiarity breeds confidence; because the instructors could be informally approached, students in our class began to ask those questions to which they secretly believed everyone else already knew the answer. We considered it an advantage that our former position as "the great authority" was gradually eroded to that of "a very knowledgeable, but still only one, possible source." Over the semester, we saw an increase in the number and quality of questions that were asked and answered within the groups and in the class. Our hitherto quiet classroom began to buzz. We consider this change to be a big achievement of the cooperative format.

Also the students saw the exercises as a way to help structure their information questions. Concrete exercises served as platforms for those detailed questions usually not formed until the instructor is long gone. We have all had the experience of watching someone solve a problem and being sure that we could do it because all the steps followed so "naturally," only to be stumped when we actually tried it by ourselves. But if students do these problems when there is someone to help overcome that bottleneck, they retain their enthusiasm and sense of progress. The cooperative format frees them to ask questions, gives them someone to address the questions to, and frequently helps them construct an answer as well.

For instructors, the cooperative format creates a wealth of information about the learning processes of individual students. We achieved insight into students' problems with the material. We knew when and where the problems were. We could immediately fine-tune the next lesson. This alone is worth the time and effort to learn how to create the cooperative classroom.

Typically, solid understanding of basic concepts and skills forms a better foundation for more advanced structures. The cooperative exercises created observable behavior in the struggling learners that opened a window to the internal cognitive processes for the watching instructors. Through this window, we were able to assess the condition of the foundation before we started to add the new floors. A delightful advantage in the classroom, don't you think?

LESSON 4: COOPERATIVE REWARDS ARE NEEDED

At first, we missed this important point about cooperative learning and relied on group grade activities. For learning and practicing basic skills, we envisioned that close collaboration, mutual support, and symbiotic development would automatically flow from working together. But it didn't happen. Group grades by themselves were not enough incentive. Even with group grades, the students still relied on individual effort for the group product and for their evaluation of how they were doing. Our grading scheme fostered this by rewarding the group based on the group product. We were encouraging the wrong thing: answers, not learning. We discovered the hard way that there has to be a positive inducement to overcome the entrenched traditional learning style.

We have experimented with creating a learning interdependence among the team members. Groups now earn their group scores as a function of the individually earned group members' scores, thus creating incentive for attending to the task and coaching other group members to improve their performance.

Not all students were enchanted with group evaluation. There was the expected concern: "Be-

ing graded as a group means that your grades are affected by others' ability to learn." The individual high achievers preferred to be on their own, without the responsibility of assisting other learners. A few of these students expressed a competitive outlook and voiced a resentment at sharing their talents and skills with someone else. We countered this argument with examples of how they were helped by the group. Then we pointed out that, in real jobs, group sharing of rewards and penalties was typical. Fortunately, this group represents a very small minority of our students.

There was another group that preferred not to be involved, although for a more altruistic reason. This consisted of the students who did not want to affect the grade of a fellow classmate. There are two different reasons for not participating offered by these students. One is that they chose the credit/no credit grading option. The other is that they think they might not do well and worry that they would unfavorably affect the group score by performing below some self-imposed standard level. We accommodated the ones who had chosen an ungraded option by not using their individual score toward their group's score. The second group began to relax as they saw that they were as much a contributor to as a benefactor of group averages.

LESSON 5: DARK CLOUDS HAVE SILVER LININGS

We began with some trepidation, expecting a Pandora's box of problems. Instead the box contained opportunities, not problems. The first opportunity concerned classroom interaction. Action in the classroom can be confused with loss of control. Our cooperative classroom looked unstructured and sounded noisy. There was an illusion of disorder. However, this hubbub signaled that something different was happening. As students and instructors were molding the learning milieu, the sound level rose. We saw the jumble as a blueprint in progress. We heard the noise as the music of enthusiastic learning.

We were reassured by our first few class meetings. The cooperative interaction did not signal a

loss of control, but rather active participation by learners and instructors. We didn't feel a loss of authority; we felt a sense of community.

Frequently, what the instructor seems to give up becomes the basis for student commitment to the class. The students gain a vested interest in learning. The instructors trade the illusion of direct control for the reality of indirect influence. Two-way influence of small-group interaction replaces one-way influence from the podium. The exchange is rewarding; everybody wins.

Extroverted students, in particular, flourish. With this material, introverted students traditionally outperform the extroverts. In our class, both improved, but introverts not as dramatically as extroverts. Because their learning style favored active participation, extroverts not only improved their own performances but also served as leaders for their groups.

The second opportunity we find is the increase in the power of communication. Messages addressed to a small group have a greater impact on the listeners. The convenience of saying something once to the entire class is offset by the advantage of the rapport established in face-to-face dialogue. Conversation allows a student immediate feedback and even the opportunity to interrupt with a question. Two-way versus one-way communication prevails and fosters active learning.

The third opportunity emphasizes the value of adaptability. Initially, we planned class activities very thoroughly and in great detail. But our plan defined only one of many possible paths to our goal. Because our cooperative classroom had so many active participants, our plan tended to dissolve. Adhering to our objective depended on being open to alternatives. We had to pursue our goal rather than steer a set course. We learned to grasp opportunities as they occurred. For example, when we assigned a programming problem as a group project, we realized that we had created an opportunity to mirror the real world, one of our cooperative learning goals. For evaluation of this assignment, we chose to have the teams demonstrate the product rather than have the instructor read it. By seeing that their reward depended on each individual's ability to explain the team prod-

uct, the students really internalized the goal of cooperative learning. After this experience, they seemed to value the underlying concept of group exercises. The group project personally fostered the understanding of cooperative learning in the students. The success we had in grasping this opportunity reinforced our goals.

LESSON 6: YOU CAN STRUCTURE FOR SUCCESS

This is one of our earliest concerns. How could we have the students productively use class exercise time if they had not done the assigned reading? A lecturer does not have to be concerned with whether the reading assignment was read. But, in a cooperative class, when exercise time rolls around, the instructor is concerned with whether the reading assignment has been read. Our expectation of the students' preparation differed from the actual facts. We could not depend upon individual students to be prepared. Many of them obviously relied upon the instructor's lecture to bring them up to speed. We realized that we could not change, almost overnight, the ingrained study habits of our entire class. Meeting our demand for preparation before each session seemed to conflict with the "crisis management" approach students used to schedule their workloads. We expected them to be prepared and they expected to have everything important explicitly pointed out during a class lecture. Positive outcome depended on their having something to work with. We found we needed to find some way to establish a foundation before the group exercises. We added a lecture and question period to the schedule. We structured the cooperative exercises so that the students could build on what they did know. Using their prior knowledge as a stepping-stone was the surest way to achieve active, productive group activity. It did not substitute for their preparation but it provided a constructive experience when they were not prepared, as was often the case. The students became more comfortable with the cooperative environment after we made these changes. Quality of participation in the group exercises improved. Their tests indicated that they learned more than they expected. The

learning sneaked up on them. Now, when we present the class, we build a lecture/discussion component into the course from the beginning. This succeeds, we think, because the familiar approach reassures the students and gives them something to build on if they are not prepared.

Although we accommodated their lack of preparation, we did not give up on trying to encourage students to be prepared. For us, part of the problem seemed to be the short period of time between Tuesday and Thursday class sessions. It just didn't give the students enough time to juggle their obligations and prepare for the class. To alleviate this time crunch, we tried meeting weekly.

Feedback from the students suggested that this helped but was not universally appreciated. One student said, "I'm especially glad we meet only once a week for a couple of hours. (That's better than trying to squeeze in lectures and seat work in an hour and fifteen minutes.)" Another commented, "Meeting once a week means less pressure during the entire week." But there was an opposing view: "Since we only meet once a week, I tend to forget a lot of things. I can learn better if I hear things more often." You will note that once again there is an articulated preference for listening, as if learning is something that floats through the air and is gathered in.

By itself, the new schedule was not sufficient to motivate preparation before class. We are also using the tried-and-true technique of a weekly quiz. The quiz had two parts and was designed to test prior material and motivate reading the new material. The quizzes were simple, short, and lightly weighted in the overall grading scheme. In our opinion, the quizzes worked. Our students were better prepared. We expected some grumbling and got it. But to our surprise, a number of our students seemed to appreciate the chance to test what they knew in what they perceived to be a low-risk situation. One student said, "The quiz I think will help a lot in preparing for the test. It also gives students like me ... a sense of what to expect on the test." Another commented, "I like constant quizzes with 'little' weight toward the final grade. It keeps you on your toes but doesn't damage [your] feet much." A true win-win situation—we got better preparation and they got low-risk feedback on their progress.

LESSON 7: LOGISTICAL NIGHTMARES DO IMPROVE

We bring this up because it surprised, and, frankly, dismayed us. Perhaps we shouldn't have been surprised, but we were. Planning the materials for the cooperative exercises took more time and effort than preparing for a lecture-style class. Even though one of us was an experienced teacher well-versed in the subject and with a well-developed understanding of the students, it took concentrated effort to find appropriate exercises and problems to be done in class by a group. In addition to the usual problem of presenting material in digestible chunks, we were trying to insure that the groups' attention would be engaged. We solved this problem on a one-by-one basis for each class. We were constrained by the class time available for group exercises. The once-a-week format has removed this constraint by giving longer contiguous periods for student interaction. It also halves our set-up time (getting into groups, handing out exercises, etc.)

However, even though it took longer than we anticipated, we think that some of our best work for our students was done during this preparation time. It was during this time that we designed a facilitating environment. The results were positive. The frequent exercises enriched the students' understanding of concepts and improved their performance on specific tasks. The experience of doing the problems revealed the advantages of actively wrestling with concrete problems with other learners. Although we did not banish the stated preference for the most passive learning role of listener, students began to appreciate the advantages of cooperation as they experienced improvements in understanding and in examination scores.

LESSON 8: SUPPORT IS WELCOMED

The support we are talking about is the kind that helps you over the rough spots. You are trying new things, and it is extremely helpful to know you have not gotten totally off base. Colleagues, nearby or far away, are one support source. In our case, we had already made supporters in each other. A colleague

who is also directly involved in the class is a welcome sounding board and a source of much-needed morale boosting. Planning the class and reviewing the results together made a world of difference to our personal confidence and to the class quality. Even if team teaching is not available, locate a kindred spirit, especially if this is as new to you as it was to us.

A convenient place to look for a friendly ear is within your immediate department. However, if you are a pioneer, this may not be a fruitful search. Our colleagues were not immediate converts to our project. Their philosophy continued to emphasize the topic and stick with the tried-and-true class format. Their attitude was that lectures were most efficient for presenting lots of material. Their attitude implied certain questions: Because instructor time with students is a scarce resource, why waste class time with students working together? How could uninformed students benefit each other? Given this attitude, they expected us to demonstrate success rather than to seek advice. Even early success met some skepticism.

If support is not available from your immediate neighbors, where else can you go? We found the Office of Faculty Development and Academic Support at our university a good source of articles and practical advice. They put us in touch with cooperative pioneers in other departments and campuses in our university system. It was reassuring to find we were not alone in trying this approach at the college level. If you have a similar instructor support center, try it.

Support can also come from farther away than your immediate campus. Fortunately for us, we knew an expert who was willing to be a long-distance mentor. She poured cold water on some of our ideas without dampening our enthusiasm. Her informed assurance that the students learn more when they are active relieved our anxiety about the possible bad effect of the new format on our students. Experienced mentors help you quickly evaluate your "brilliant ideas." If you find sources like this, latch onto them.

Besides a single mentor, individuals with similar interests tend to form networks. We recently discovered two networks concerned with cooperative

learning. These are the Association for Supervision and Curriculum Development (ASCD) network¹ and the Professional and Organizational Development (POD) network.² In addition to linking you to other people, joining a network usually opens access to other sources of information, through newsletters, directories, and meetings at professional conferences.

If all other sources fail, "read the directions." That is, select from the abundant literature on cooperative learning. The literature can pick out some potholes in the road. We could have avoided some of our classic errors if we had used the available literature.

SUMMARY

This is only one experience with introducing cooperative learning into university-level courses. Oth-

ers have ventured along a different but equally successful course. This is not the only way, or even the right way, to go about it. It's just one way that worked. Even with the problems we encountered, whether from our own ignorance or from external factors, we feel we succeeded. An adventure such as this calls upon a gambler's instincts, an explorer's skills, and a lion's heart. The rewards are worthy of the challenge.

NOTES

1. This network is called ASCD Network on Cooperative Learning. For information write Association for Supervision and Curriculum Development, 1250 N. Pitt Street, Alexandria, VA 22314-1403.
2. This network is called POD Network in Higher Education. For information write POD Network, Teaching and Learning Center, University of Nebraska, 121 Benton Hall, Lincoln, NE 68588.

REFERENCES

- Bellanca, J., & Fogarty, R. (1990). *Blueprints for thinking in the cooperative classroom*. Palatine, IL: Skylight Publishing.
- Fogarty, R. (1990). *Designs for cooperative interactions*. Palatine, IL: Skylight Publishing.
- Gersting, J. (1989). The other two Rs in the discrete mathematics course. *Computer Science Education*, 1, 293-299.
- Gibbs, J. (1987). *Tribes: A process for social development and cooperative learning*. Santa Rosa, CA: Center Source Publications.
- Groves, N. B., & Groves, T. D. (1985). Creating a cooperative learning environment: An ecological approach. In R. Slavin, S. Sharan, S. Kagan, R. H. Lazarowitz, C. Webb, & R. Schmuck (Eds.), *Learning to cooperate, cooperating to learn*. New York: Plenum.
- Myers, I., & Briggs, K. (1962). *The Myers-Briggs type indicator: Manual*. Princeton, NJ: Educational Testing Service.
- Slavin, R. (1991). Synthesis of research on cooperative learning. *Educational Leadership*, 48(5), 77-82.
- Webb, N. M. (1985). Student interaction and learning in small groups. In R. Slavin, S. Sharan, S. Kagan, R. H. Lazarowitz, C. Webb, & R. Schmuck (Eds.), *Learning to cooperate, cooperating to learn*. New York: Plenum.

COOPERATIVE LEARNING WITH ADULT LEARNERS

—
Therese Bissen Bard

Cooperative learning is the best thing since bubble gum, or whatever that saying is.

—Graduate student, School of Library and
Information Studies, University of
Hawaii at Manoa

My experience with cooperative learning at the University of Hawaii spans over seventeen years. More accurately, my experimentation with various cooperative learning activities covers that period of time. My method, regrettably, has been based on trial and error rather than a systematic approach.

My educational aims for cooperative learning during those first few years were vague at best. I thought sharing ideas in class discussions and small groups was a good thing. Exactly why it was a good thing, I wasn't sure. There was also a practical matter. Classes at the School of Library and Information Studies (SLIS) meet for three hours once a week, and at least one of my classes each semester would meet in the early evening. Many of the students in the evening classes had already worked all day. Three hours of lecturing to them would have

been ineffective. It might even have been called cruel and inhuman punishment—when the only crime committed had been to enroll in an evening course.

Cooperative learning is only one instructional method I use in my courses. I combine cooperative learning with lecturing, audiovisual presentations, guest speakers, field trips, and other instructional methods as appropriate for subject content and course objectives. During an academic term I spend approximately one-third of class time on cooperative learning, but the students may spend as much as one-half to three-fourths of their out-of-class time on these activities.

After a few years I dignified these class discussions with a name. I called them "peer learning," a term that does not describe what my students or I were doing. Peer learning, as I interpret the term, implies that one or more members of the group has knowledge to impart to others. The each-one-teach-one method of adult literacy instruction is an example. One or more children teaching others in a group how to play a new game is another. Peer learning as a formal instructional method normally means at least one member of the group already has the knowledge or skills that are to be taught. An

instructor may be present to facilitate learning but is not a learner participant.

Cooperative learning expresses more accurately the instructional method my students and I were using. Unsystematic as my approach may have been, we were learning from one another. We learned about library and information studies, and we learned about learning. And, despite some resounding failures, the method has been successful.

In this chapter, based on my experience as a teacher at the school of Library and Information Studies¹, I will discuss planning a course for cooperative learning; instructional methods; teaching strategies and techniques; problems; and my conclusions and recommendations.

COOPERATIVE LEARNING METHODS

Different methods of cooperative learning are appropriate for different subject content, to meet different course objectives, and for different types of responses the instructor expects from students.

Small Group Discussions

People tend to respond more comfortably when in small group situations rather than large groups. Individuals are more attentive, supportive, and able to interject their own opinions with ease.

You are not only responsible for your own learning but also for the group's learning. You tend to prepare better because you want to be a contributing member of the group.

There are some drawbacks. There is a tendency in any group for one or two people to dominate the conversation unless firmly stomped upon. I speak from experience, as usually I am the one who needs to shut up and let other people talk for a change.

Group discussions often get sidetracked into areas that, while fascinating, have little relevance to the subject we are supposed to be discussing.

—Graduate students, School of Library and Information Studies

Small group discussions held during class time work well for:

- sharing responses to or criticism of literature written for children or young adults;
- in-depth discussion of assigned readings; or analysis and evaluation of journal articles, research articles, model projects for library services, and other types of professional literature.

The Socratic Method

I like the professor to lead a full class discussion on a book we have all read. I like probing questions, and I like to hear how other people see things. There are always people who see more than the rest of us.

—Graduate student, School of Library and Information Studies

The Socratic method used in a class discussion works well for:

- an assigned reading that raises profound and disturbing questions about the human experience; or
- a film, video, or other learning activity shared by the entire class that stimulates thinking about a topic relevant to the course for which there are no easy answers.

Informal Class Discussions

Class discussions are a useful learning method to share and synthesize material. It allows one the luxury of listening to others and learning from them. Muddy areas or convoluted thinking can be clarified. It enables one to go 'aha' even after an especially tedious session.

—Graduate student, School of Library and Information Studies

Informal class discussions work well for:

- a topic of general interest to the class that engages the students' feelings, e.g., censorship of library materials;
- response to a shared learning activity that presents new ideas and broadens students' perception of a subject, e.g., a video presentation or a guest speaker; or
- a topic for which there are answers that are generally acceptable to the profession and the

students, e.g., how to implement outreach programs for library services.

Dyad Discussions

When both persons are prepared with their own ideas and opinions, dyad discussions are fascinating and a great way of learning.

—Graduate student, School of Library and Information Studies

Dyad, meaning two individuals forming a pair, is an unfamiliar word to most of our students, and a dyad discussion is an instructional method few SLIS students have used previously. I assign dyad discussions as an out-of-class course requirement. Dyad discussions work well for:

- substantive, dense readings that require students to analyze and evaluate what the author is saying; or
- readings on controversial topics that may require the student to do additional background reading as a preparation for their dyad discussion.

Group Term Projects

A group can cooperatively produce a superior product.

—Graduate student, School of Library and Information Studies

Term projects that involve two or more students challenge their ability to work as a team over a period of time. This cooperative activity works well for:

- substantive projects that require time for research, preparation, organization, and presentation;
- complex projects that require students to achieve at all levels of Bloom's and Krathwohl's taxonomies (Bloom, 1956; Krathwohl, Bloom, & Masia, 1964); or
- projects that require a variety of knowledge and competencies so that individual students may make a unique contribution to the success of the completed project.

Writing Groups

For writing assignments, I had groups help each other from pre-writing to proofreading and found the students loved it as much as I did.

—High School English teacher and graduate student, School of Library and Information Studies

Graduate students, like all writers, may suffer from paralyzing blocks. Two or four students working together in a group may help each other overcome their writing blocks and improve the quality of their work. This cooperative learning activity works well for any type of writing assignment if the participants believe in the idea of writing groups, set up simple rules for the group process, and follow these rules faithfully.

I introduced writing groups as a type of voluntary cooperative learning to one class this past semester. Unfortunately, I did not provide adequate guidance to the students. None of them had had experience with writing groups, so, except for two students working together, the activity just fizzled out. Next semester I plan to prepare guidelines and work with the students more closely. I have found a writing group invaluable in my own professional writing, and other instructors, like the English teacher quoted above, have had success with this method. It has the potential to raise the quality of students' writing at the graduate level.

Study Groups for Examinations

Everyone brings to the study group a culmination of all the wisdom gotten from other classes and from their own experiences.

—Graduate student, School of Library and Information Studies

Studying together for examinations has, in my experience, improved the performance of students on midterm and final exams. Study groups work well in preparing for:

- both essay and objective exams;
- an exam for which the instructor has provided a study guide; or
- a situation in which the students know the instructor will adhere to the study guide and not surprise them with trick questions.

Learning Exercises

We need more cooperative learning exercises.

The exercises give us practice experience we can apply to real library situations.

—Graduate students, School of Library and Information Studies

Cooperative learning exercises can be done either in class or as an outside assignment. They can be graded or ungraded. This activity works well for:

- exercises that can be completed in a short time, perhaps twenty to thirty minutes in class or an hour or two outside of class; or
- exercises that present a problem that has a right answer or, at least, a plausible solution.

STRATEGIES AND TECHNIQUES FOR COOPERATIVE LEARNING

Basically, teaching strategies and techniques for cooperative learning do not differ from traditional university teaching. Planning, communicating, and evaluating remain the essential components of instruction.

Planning

The teacher's mind-set differs for cooperative learning activities. Therefore, the planning process differs. In developing a course and designing instructional units, the teacher no longer asks, "How can I present this subject so that each student can understand it?" Planning cooperative learning demands a more complex question, "What activities am I able to design that will help my students understand the content of this course better through cooperative learning than they would have been able to do through individual assignments?"

Effective and efficient cooperative learning depends upon the quality and appropriateness of the instructional materials the teacher prepares. Perhaps the key component to successful planning for cooperative learning is "over-organization." Organization of both the course and of each class meeting is vital. For example, organization for small group discussions may seem a simple matter, but it is not. Sometimes it is educationally effective

to place students in different groups as frequently as possible. Other times it is more effective to have students work in the same group for a period of several weeks or even during the entire term.

Seemingly small matters affect the quality of learning. For example, does the teacher choose the group leader? If so, how? If not, how is the leader chosen? Choice of the discussion leader is an important decision because the leader is pivotal in group discussions.

Organization is essential for the first class meeting in which small groups are used. First, the teacher should prepare the discussion questions. All of the small groups may have the same question, or each group may have a different question. Then the teacher should decide who will be in each group. It is also advisable for the teacher to select the group leader and the member of the group who will report back to the class on the discussion. Finally, the teacher should prepare a handout that states the discussion question or questions, lists all the groups, and identifies the leader and the reporter for each group.

Later in the term, especially with relatively small classes, this level of organization for small group discussions is not necessary, but it is crucial at the beginning of the term for the students to have the security that detailed organization provides. Organization remains important throughout the term, however, even if it is not as controlled as at the beginning.

Communicating

Writing clear and comprehensible course materials; explaining performance expectations in adequate detail; being attentive to students' problems with cooperative learning; asking discussion questions that elicit thoughtful responses; listening to what the students are saying; attending to everything that occurs during a cooperative learning activity; reinforcing student contributions; creating a warm, supportive class environment—these and more are part of the communication process for cooperative learning. A class period is a time of "eternal vigilance" as the teacher encourages and monitors student expression and participation.

In an effort to communicate with students concerning cooperative learning as an instructional

GUIDELINES FOR COOPERATIVE LEARNING IN THE CLASS

Cooperative learning will be stressed in this class. Approximately one-third of class time will be devoted to cooperative learning activities, primarily small group discussions, class discussions, cooperative learning exercises, and student presentations of cooperative projects. In addition, much of your out-of-class time will involve cooperative learning. This amount of time will vary from student to student depending on our choice of assignments to meet course requirements.

These guidelines list objectives for cooperative learning in this course, identify my responsibilities as a teacher and yours as a student, and suggest steps to follow in preparing for cooperative learning activities.

Objectives

Cooperative learning will enable students to:

- enhance critical thinking and problem-solving skills,
- improve comprehension of course content,
- improve communication skills—listening, speaking, and writing,
- strengthen a positive attitude toward working on cooperative projects and activities,
- experience working as a member of a group toward a common goal, and
- simulate—within the limits of course content and the learning environment—the types of cooperative activities in which librarians are involved.

Responsibilities of the Teacher

- The instructor **plans** the course of the term, integrating cooperative learning activities as appropriate for course content and objectives.
- The instructor **prepares** for each class session so that cooperative learning activities are effective and efficient instructional methods.
- The instructor **monitors** in-class cooperative learning activities.

- The instructor **evaluates and re-evaluates** each class session by trying to answer the question, "How could I have done this better?"

Responsibilities of Students

- Students are **aware** that they are responsible not only for their own learning but for others who are participating in cooperative learning activities.
- Students **prepare thoroughly** by making sure they understand the content and are able to express themselves intelligibly.

How to Prepare for a Cooperative Learning Activity

- Analyze the reading, book, presentation task, project, or "whatever." Identify the thesis statement for a reading, especially a journal article, and the purpose or objective of a book or other library item, presentation, or project.
- Even if you are an inveterate highlighter, jot down the thesis or purpose. I don't know if any research studies show writing brief notes in addition to highlighting to be an effective learning device, but I do know teachers who are convinced highlighting by itself is not effective in analyzing a reading.
- Identify the arguments and evidence that support the thesis or the methods used to elucidate the purpose. Again, jot down brief notes.
- Evaluate this material. Do you think the thesis is valid? The purpose worthy? Do the arguments or activities support the thesis or purpose? Make brief notes of your evaluation.
- Finally, is the material relevant to library materials and services? Note briefly your assessment of relevance.
- Bring these brief notes to the cooperative learning activity. By brief, I mean words, phrases, sentence fragments, occasionally a complete sentence.

Figure 1 Cooperative Learning Guidelines

method, I have prepared a handout that addresses the students directly and spells out the objectives of cooperative learning for the course, responsibilities of the teacher, responsibilities of the students, and suggestions to the students on preparing for a cooperative learning activity. The content of this handout changes as my perception of cooperative learning evolves. Essentially, however, I emphasize the same basic ideas every semester. A recent handout is reproduced in Figure 1.

Evaluating Cooperative Learning

Cooperative learning activities such as discussions, learning exercises, and writing groups do not require evaluation, at least not formal, graded evaluation, but group projects do. Evaluating these can be difficult. I will discuss difficulties involved with evaluating group projects in the next section.

Fortunately, cooperative learning activities need not replace individual work for the course. Formal evaluation of individual contributions to group

projects, individual assignments, quizzes, and examinations will yield adequate information for a fair assessment of each student's academic performance.

PROBLEMS WITH COOPERATIVE LEARNING

Cooperative learning has problems that are inherent to the method. The teacher cannot cover the same amount of content as with the lecture method. Both the students and the teacher spend more time in preparation. A certain amount of student resistance, varying from class to class, invariably presents itself. Even students who support the idea of cooperative learning may not fulfill their responsibilities to themselves and their fellow learners. The learning environment may affect cooperative learning activities adversely. Teachers may fail to evaluate cooperative class projects fairly.

Covering the Course Content

No instructional method surpasses the lecture in providing a logical, coherent, fast-paced presentation of subject content. The teacher controls the selection, organization, and presentation of information. The process remains on task and on track.

In contrast, cooperative learning is not an efficient method to cover the material. Group discussions take time, more time than presenting the topic in a lecture. The teacher accepts this limitation, if it is a limitation, and aims for depth rather than breadth of a coverage, for less information but more knowledge. The active, albeit time-consuming, participation of the students in discussion enables them to both assimilate and conceptualize the subject. Because the student is actively involved, retention may be greater than in the more passive mode of the traditional lecture.

Preparation Time

The cooperative method requires more preparation, much of it extremely time-consuming, from both the teacher and the students. Moreover, this in-depth preparation is necessary for every class meeting. No one, teacher or student, can "slip through" a single class.

The teacher must prepare discussion questions or cooperative activities that meet the learning objectives for the topic, achieve these objectives in the time available, stimulate critical thinking, and enhance problem-solving skills. Such thorough preparation consumes considerably more time than is necessary to prepare lecture notes. Despite the most careful preparation, however, university teachers who use cooperative learning sometimes feels that the legendary Murphy's Law singles them out. If anything can go wrong, it will go wrong. Students misinterpret questions that had seemed impervious to misinterpretation. A key student to the planned class activity is absent. Essential equipment, learning materials, or physical facilities are suddenly unavailable.

Matters of little consequence to teachers using the lecture method can seriously affect planned cooperative learning activities. Lecturers are not greatly inconvenienced when overhead projectors mysteriously disappear, the xerox machine breaks down, the scheduled video vanishes, or the regular classroom is pre-empted. But such small matters can torpedo the most carefully prepared cooperative learning activities. Fortunately, a sense of humor and an alternative set of plans for the class will keep Murphy's Law at bay. But the alternative set of plans, obviously, adds to the already burdensome preparation time.

Students also must spend more time in preparation. They cannot slide through a class meeting without having done the readings as they can with a lecture. And they, too, must be thorough in their preparation. Our students at SLIS are conscientious. They feel they will let down their classmates if they do not prepare adequately. Although keeping up with class activities enhances learning, the pressure to do so regularly and without fail can become stressful. Students apologize profusely to the other members of their discussion group when illness, other pressing responsibilities, or unforeseen events prevent them from preparing adequately.

Student Resistance

Students who have had no experience with cooperative learning often resist an unfamiliar approach to education. They have become familiar

with the lecture method in university classes and are comfortable with taking notes of the professor's lecture and having minimal class interaction. To them, this is *the* appropriate method for university education. Cooperative learning is an "elementary school" methodology. They can become very hostile to a professor they feel is not doing his or her job. They define the job in this instance as lecturing. A very few are totally imbued with the idea of the superior knowledge of the teacher and have little or no faith in the contribution their classmates can make to their learning. A few students are uncomfortable working with others. For them, learning is a solitary activity. They confuse class discussion with "shared ignorance."

Students' Failure to Meet Responsibilities for Cooperative Learning

Students at the School of Library and Information Studies seldom fail to meet their responsibilities for cooperative learning activities. Those who do so may lack the ability to work at the same level of others in their group, may not understand the requirements of the activity, or, infrequently, may simply freeload. Other students try to help a group member who lacks the ability to achieve at the group's level. They may be less tolerant of the student who doesn't understand the requirements of the activity, especially if they feel that person hasn't made a genuine effort to understand. As one would expect, most students become angry with the freeloader in their midst. Others accept a freeloader as a reality they will have to deal with at times in their professional careers. No matter how philosophically some members of the group react, the student who deliberately refuses to accept a reasonable share of responsibility for the cooperative activity presents a problem to the group, to the other students in the class, and to the teacher. The responsible members of the group must carry an additional work load. The quality of the learning activity may suffer, thereby depriving the class as a whole from learning as much as they might reasonably have expected from the group's project. The teacher's objectives may not have been met at the anticipated level. As a result, fair and impartial evaluation of a group that has not functioned as a working unit is difficult.

COOPERATIVE LEARNING AND THE LEARNING ENVIRONMENT

The learning environment includes all the conditions that affect learning, such as the physical facility, the personality of the class, interaction among students, interaction between the students and the teacher, and class size. Although the environment affects all instructional methods, cooperative activities may depend more than other types of instruction on a positive learning environment.

Physical Facility

The physical facility impacts upon cooperative learning activities. Most of us remember the university classroom with student desks bolted to the floor. The larger ones had a raised dais where the professor stood behind a rostrum on which he set his notes. These classrooms, more accurately called lecture halls, were planned for the traditional university lecturer. They do not lend themselves easily to cooperative learning although an imaginative teacher can adapt them to group activities. On the other hand, a spacious classroom with movable student chairs, desks, or study tables facilitates cooperative learning.

Class Personality

As every teacher knows, every class has a unique personality. Two sections of the same course can be so different that a teacher has to adjust instructional methods and course requirements. Attitudes, either positive or negative, of individual students, especially students who are natural leaders, affect the learning environment. Students' attitudes, academic ability, background knowledge, and life experiences combine to create a distinctive class character. Teachers, no matter what type of instructional methods they use, react to negative messages students send them. This holds true whether the students communicate verbally, through body language, poor academic performance, frequent absences, or in other ways. The university professor who relies primarily on the traditional lecture method, however, controls learning activities to a greater degree than the teacher who

emphasizes cooperative learning. Student negativism, always difficult to deal with, can torpedo the best-laid plans for an instructional method predicated upon student cooperation.

Interaction Among Students

We have such interesting people in this class. They've done so many different things and have such a variety of backgrounds.

We all work together and learn from one another. We don't compete for grades.

—Graduate students, School of Library and Information Studies

Positive interactions between students promote cooperative learning. Such attitudes include the willingness to share, mutual trust, making the effort to get to know one's classmates as individuals, enthusiasm for a free and open exchange of ideas, and ability to form good working relationships. These attitudes characterize students who will interact positively and create a class environment conducive to cooperative learning. In contrast, students who prize their individual prerogatives, focus narrowly on their own objectives, fear competition from other students, find exchange of ideas threatening, and resist forming working relationships do not interact successfully with other students. They perceive cooperative learning as limiting their intellectual horizons. Several of these students in a class, especially if they have leadership ability, may inhibit classmates who might otherwise have found cooperative learning consonant with their personalities and learning styles.

Interaction Between Students and Teacher

Successful cooperative learning activities depend upon free and frequent interaction between the students and the teacher. Students who feel comfortable seeking out the teacher for help and advice will achieve at a higher level than students who are hesitant to ask a teacher for suggestions on how to approach a course requirement, for clarification of guidelines, or for assistance in solving problems related to a learning activity. Likewise, teachers who are not accessible to students will not

realize the full potential of cooperative learning. As with class preparation, this interaction between students and teacher absorbs considerably more time than traditional instructional methods. Both the students and the teacher may find it difficult to fit this additional time into already crowded schedules. These barriers to student and teacher interaction may create problems that adversely affect cooperative learning activities.

Class Size

Class size affects planning, implementation, and evaluation of cooperative learning. Classes of fifteen or fewer students fall naturally into the cooperative learning mode. Small classes can accommodate a variety of cooperative learning activities effectively and efficiently. Conversely, classes of thirty or more graduate students are more challenging to handle in a cooperative mode. Large classes require more detailed planning, may not be able to accommodate as many cooperative learning activities, and present obstacles to precise and impartial evaluation. Despite these problems, cooperative learning will also work with large graduate classes. Teachers and students are able to meet course objectives using this method, but they must be willing to expend more effort and to realize that some negotiation and adjustment of evaluation procedures may be necessary. In short, cooperative learning works well in large classes if both teachers and students remain patient and understanding throughout the academic term.

EVALUATING COOPERATIVE CLASS PROJECTS

How does a teacher evaluate a cooperative class project fairly and accurately? What problems does one need to solve in doing so? Do some of these problems elude solution? If so, how can a teacher avoid the pitfalls inherent in evaluating cooperative class projects and yet provide students with these valuable learning experiences?

First of all, we need to realize that evaluating the project is not really the problem. What concerns the teacher and the students is evaluating each student's contribution to the project. If the project

is truly cooperative, that is, if it is not possible to identify each student's contribution, evaluation may be difficult. If, on the other hand, the individual student's contributions to the project can be rather easily identified, evaluation becomes only a minor problem. So we will deal only with those projects that are truly cooperative.

Let's say the teacher evaluates the project as excellent and gives it an A. But something seems amiss. The students are not at ease about the grade. The teacher might conclude that not all members of the group deserve the A, not a difficult conclusion to reach. Much more difficult is to find out which student or students did not contribute adequately to the project.

One can ask the students to evaluate one another, perhaps not to give a letter grade but to write comments on each student's contribution. This may or may not work. Most likely it will not. Students' reluctance to evaluate one another is legendary.

Another approach is to discuss the project with each student individually. In doing so, one can emphasize the process the students followed in reaching their final product, namely the completed project. This may elicit helpful information. Or it may not. The legendary code that says you do not squeal on your buddy is still in effect. Yet the teacher can discern enough information from what is not said or is implied to be able to make a fairly accurate assessment of individual contributions to the project.

Let's assume the teacher obtains a reasonably accurate assessment of each student's contribution and decides upon individual grades based on this assessment. What then? In the best possible scenario, all of the students who worked on the cooperative project will accept their individual grades as a just and fair evaluation. But the process is difficult and time-consuming.

In the worst possible scenario, however, one or more students may not accept their grades and may take their complaint to the department chair or the dean of the school. Then the teacher must prove the accuracy and fairness of the individual grades. What proof was obtained? What documentation, if any, resulted from the interviews? What other evidence can the teacher present? Now the evaluation process tee-

ters on the threshold of the university's procedures for dealing with student complaints. The weary teacher can be excused for asking, "Is it worth it?"

In most instances, however, a cooperative project reflects similar commitment and involvement from all of the students. Problems in evaluation usually do not arise. Teachers should not avoid assigning cooperative group projects because they fear evaluation may lead to student complaints. They may wish, however, to design the project in a way that allows them to identify individual contributions to the final product.

I have had no problems with evaluating group projects, but I have attempted to design these activities so that I could identify individual contributions. I feel that I have been fair and accurate within an acceptable margin of human error. No student has ever questioned my grades to individual members of the group for a cooperative project.

CONCLUSIONS AND RECOMMENDATIONS

Cooperative learning in my class at SLIS has been increasingly successful through the years. This is indicated by student performance, student response, and student evaluation of my courses. Students' critical thinking and problem-solving skills have improved. Students have consistently performed at the higher levels of Bloom's *Taxonomy* analysis, synthesis, and evaluation (Bloom, 1956). With very few exceptions, they have responded positively to cooperative learning activities. As my skill in using cooperative learning as an instructional method has improved, so have the students' evaluations of my use of it in my courses.

I recommend cooperative learning to teachers in professional graduate schools. It works. I suggest, however, that no one follow my trial-and-error method. Reading the professional literature and attending workshops would result in more immediate success than I experienced. But I have no regrets. I found the rewards to be well worth the occasional disappointments that accompanied my failure to foresee and forestall problems and pitfalls inherent in my learn-as-you-go approach.

NOTES

1. I prefer to use "teacher" rather than "professor" when referring to my role as an educator. "To teach" more precisely describes my responsibilities at SLIS than "to profess" does.

REFERENCES

- Adams, D. M., & Hamm, M. E. (1990). *Cooperative learning: Critical thinking and collaboration across the curriculum*. Springfield, IL: C. C. Thomas.
- Bloom, B., (Ed.). (1956). *Taxonomy of educational objectives, the classification of educational goals, handbook I: Cognitive domain*. New York: David McKay.
- Costa, A. (1985). *Developing minds: A resource book for teaching thinking*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Dishon, D., & Wilson-O'Leary, P. (1989). Tips for teachers. *Cooperative Learning*, 10(3), 30-40.
- Graves, T. (1990a). Cooperative learning and academic achievement: A tribute to David and Roger Johnson, Robert Slavin, and Shlomo Sharan. *Cooperative Learning*, 10(4), 13-16.
- Graves, T. (1990b). Non-academic benefits of cooperative learning. *Cooperative Learning*, 10(3), 16-17.
- Griffith, S. C. (1990). Cooperative learning techniques in the classroom. *Journal of Experiential Education*, 13(2), 41-44.
- King, A. (1990). Enhancing peer interaction and learning in the classroom through reciprocal questioning. *American Educational Research Journal*, 27(4), 664-87.
- Kluge, L. (1990). *What we know about cooperative learning*. Arlington, VA: Educational Research Service.
- Kohn, A. (1991). Don't spoil the promise of cooperative learning: Response to Slavin. *Educational Leadership*, 48(5), 93-94.
- Krathwohl, D., Bloom, S., & Masia, B. (1964). *Taxonomy of educational objectives, the classification of educational goals, handbook II: Affective domain*. New York: David McKay.
- Prescott, S., & Wolff, D. E. (1990). Cooperative learning as a teaching strategy in elementary and secondary teacher education courses. *Teacher Education Quarterly*, 17(2), 41-58.
- Rockman, E. F., (Ed.). (1991). Reference librarian of the future: A symposium. *Reference Services Review*, 19(1), 71-80.
- Slavin, R. E. (1991). Synthesis of research of cooperative learning. *Educational Leadership*, 48(1), 71-82.

AN AGENDA FOR ALL SEASONS

James Bellanca

Upper Jay, New York may well be the birthplace of the modern cooperative learning movement. In the early seventies, Roger and David Johnson migrated from the Midwest to a small conference center buried in the Adirondack Park. There they conducted—usually for three or four people and millions of black flies—their early rendition of basic cooperative learning.

What started as a move to make the teaching of constructive social skills and the resolution of conflict easy for the classroom teacher has grown into a movement with many purposes. These include: teaching social skills and increasing self-esteem (Kohn, 1986), improving student achievement (Slavin, 1983b), resolving conflict (Johnson & Johnson, 1979), developing cooperative social skills (Cohen, 1986), embedding graphic organizers (McTighe & Lyman, 1988), and building higher-order thinking (Bellanca & Fogarty, 1991). Unlike many other educational movements, cooperative learning carries with it a substantive body of research. This research supports the claims of cooperative learning. For those educators who work cooperation into the future of their schools,

cooperative learning has established itself as an agenda for all seasons.

Cooperative learning is a philosophy, an instructional strategy, and the bedrock of cognitive instruction. When a school combines all three into a single approach, a strong foundation for teaching, learning, and living is set in place.

Cooperative learning is based on the belief that school life, family life, and work life are enhanced when individuals care about each other and work together for mutual goals. "We sink or swim together," "All for one and one for all," and "Three heads are better than one" are common expressions of the cooperative spirit. In the schoolhouse, cooperative learning takes many forms. When the belief system of cooperation and caring saturates all corners of all classrooms, it is possible to see the most powerful effects.

Espousing the principles of cooperation is not enough. The philosophy entails a host of carefully scrutinized strategies. The strategies are the practical tools which enable teachers to enable learning in new ways. As teachers expand a repertoire of cooperative strategies, they build a strong foundation for students not only to work together, but also

to take greater responsibility for individual learning (Johnson & Johnson, 1987).

It is very easy for the uninitiated to confuse cooperative learning with general grouping practices. The definition of cooperative learning, two or more students of different ability working together for a common goal, gives the first clue that cooperative learning is more than assigning students to work together. In general grouping practices, students may work together, but each retains individual goals. These students learn individually ("I have my science lab book") or competitively ("My answer is better than yours"). In cooperative learning, however, the students work to achieve a single goal ("We did it").

The skilled teacher who uses cooperative learning calls upon several key elements—the critical attributes of cooperative learning—which make this strategy unique. When all these attributes are present in lessons, purposefully created by the teacher, there is true cooperative learning. When one or more of the attributes is absent, there is little more than a group doing individual work in the same location.

The cognitive model of cooperative learning has five critical attributes summed up in the **BUILD** acronym:

- Build on higher-order thought.
- Unify the teams.
- Invite individual accountability.
- Look back and evaluate the quality of thinking and cooperating.
- Develop social skills.

The best of cooperative lessons integrate all five attributes. The best of cooperative classrooms do so day in and day out as the heart of instruction. When a skilled teacher builds such a classroom it is a common sight to see students working together cooperatively 60 to 75 percent of the day.

The list of cooperative strategies a teacher can use to facilitate these attributes is about as endless as the stars. Teams, Games, and Tournaments (Slavin, 1983a); thought teams (Bellanca & Fogarty, 1991); four heads together (Kagan, 1990); jigsaw (Kagan, 1990); three-to-one questions (Bellanca &

Fogarty, 1991); team organizers (Bellanca & Fogarty, 1991); tribes (Gibbs, 1987); roles (Johnson & Johnson, 1979); BUILD charts (Bellanca & Fogarty, 1991)—the volume of strategies is both a blessing and a curse.

First, consider the curse. It is easy for a teacher to dabble in cooperative groups: Teacher A learns jigsaw. Teacher B does Teams, Games, and Tournaments. Teacher C posts guidelines for cooperative work. Teacher D loves four heads together. By picking a strategy or tool to throw into the classroom milieu now and then, each can assume he or she is doing cooperative learning.

Now, consider the blessing. When a teacher elects to teach students *how* to work as a team, he or she is laying the foundation for a cooperative classroom. Whether the teacher uses cooperative strategies synthesized into a personal approach or a pre-packaged model matters little. What matters more is making a serious, regular, and consistent effort to use cooperative learning as the foundation of learning in the classroom and the core for improving basic skills, social skills, and thinking skills.

The full potential of cooperative learning, however, is not reached by limiting it to helping students score better on memory work, vocabulary, spelling, or math worksheets. Such improvement of basic skills is necessary, but it is just a start. Cooperative learning's full potential is used when it is the bedrock for caring and thoughtful classrooms. When the teacher—better yet, the entire teaching family in a school—uses the cooperative social skill model to build the cooperative spirit throughout every classroom (Glasser, 1986; Kohn, 1986) and takes advantage of cognitive strategies to make every classroom a "home for the mind" (Costa, 1991), the outcome is much more likely to stretch children and teachers far beyond normal performance expectations.

In this context, effective teaching and learning occur when the teacher is skilled enough to manage cooperative learning as the foundation for a triple agenda classroom. This triple agenda encompasses content, cooperation, and complex thinking. When all three elements are entwined, the effectiveness of each approach is exponentially powerful.

Consider how a triple agenda lesson differs from the ordinary content-only lesson, or even the cooperative lesson that is limited to recall outcomes.

A HIGH SCHOOL EXAMPLE

A Single Agenda: Content Only

In this lesson, a U.S. history teacher assigns all students in the class to "read the next chapter." On the following day, the teacher gives a quiz (the grades include five As, twelve Bs, thirteen Cs, seven Ds, and three Fs) and puts the grades in the grade book. He or she next lectures on the materials. In the lecture he or she shows several studies, asks three theoretical questions, and uses a colored overhead as an outline. For the next two days, the teacher spends ten minutes in a guided discussion asking students' opinions on the causes of the Civil War. The discussion is closed with a summary review and an admonishment that everyone study for the unit final.

The Double Agenda: Cooperation and Content

In this lesson, the teacher assigns previously established base groups to jigsaw the next chapter. Each one of the three students in a group reads one-third of the material. The students then teach each other about their respective portions. On the next day, the teacher uses expert groups to check for understanding of their reading about the war's causes. After the expert groups are finished, each base group works on a three-to-one worksheet (Bellanca & Fogarty, 1991) to help them pull together the key information. On the next day, each group recorder reports on what the group has learned about the causes and explains why it has made its selections. On the overhead, the teacher records the key concepts reported by each group. Next, the teacher guides a discussion to clarify the main points. On the third day, he or she instructs the base groups to review the material from their notes; check that every group member can explain all of the material; and make a list of the ways they have helped each other learn. On the fourth day, the teacher tests individual students' knowledge of the Civil War's causes.

The Triple Agenda: Content, Cooperation, and Complex Thinking

In this lesson, the teacher uses a KWL goal-setting chart in the pre-set base groups (Bellanca & Fogarty, 1991). Each group lists what it already knows about how the Civil War began and what they want to learn about the war. By now, they are used to the learning expectations.

After the groups finish their lists, the teacher elicits a comprehensive list for the whole class for both categories. The base groups then do a jigsaw reading in the text with instructions that each individual make a causal web (Bellanca & Fogarty, 1991) of an assigned section. (At this point in the course, they have already learned how to do this.) The teacher writes on the board the triple agenda objectives:

At the end of this unit, you will:

- identify the causes of the Civil War,
- evaluate the causes of the Civil War, and
- apply the conflict resolution skill of persuasion.

On the next day, the teacher assigns expert groups to compare webs on each section. After the expert groups do their work, students go back to the base groups with instructions on how to use a fishbone organizer (Bellanca & Fogarty, 1991). In the base groups, the recorder notes the instances of positive persuasion used by members to resolve disagreements.

On the third day, each team is instructed to place in rank order the principle causes of the war. After agreeing on the number one cause, each team develops its rationale. In the second half of the class period, each team has the chance to make its case. For homework, students are assigned to review their team's case for the number one cause and to prepare an evaluation of the case using the teacher's standard check form.

On the fourth day, the teacher gives a quiz asking each student to identify the causes discussed in the class; explain the importance of two persuasion methods used; and write a short paragraph evaluating defense of the group's number one choice. The quiz is followed by a discussion of persuasion techniques. In this discussion, each group lists its

HIGH SCHOOL INSTRUCTIONAL STRATEGY		
SINGLE AGENDA <i>(Content Only):</i> • homework • reading quiz • lecture • theoretical questions • opinion discussion • summary • recall test	DOUBLE AGENDA <i>(Content and Cooperation):</i> • base group/homework • expert groups/check for understanding • base group/three-to-one questions • recorder reports and defends • clarification discussion • base-group review • base-group evaluation • test-recall and explanation	TRIPLE AGENDA <i>(Content, Cooperation, and Complex Thinking):</i> • KWL goal-setting chart • class list—advanced organizer • base groups • jigsaw homework • triple objectives • base groups/attribute webs • fishbone organizer • recorder observes • persuasion • rank order • case study • evaluation • test—identify, persuade, and evaluate teamwork

Figure 1 High School Instructional Strategy

favorite techniques and then the teams debate each other (see Figure 1).

AN ELEMENTARY SCHOOL EXAMPLE

A similar outline contrasting the three agendas is possible with a third grade science lesson:

A Single Agenda: Content Only

In this lesson the teacher distributes a science text to each student. The unit is trees. The teacher calls upon individuals to read aloud each paragraph. When the reading is done, the teacher instructs the students to answer the questions at the chapter's end. After ten minutes, the teacher tells them to put away their materials. Those not finished with the questions must complete the work at home.

On the next day at science time, the text questions are reviewed and different students are called

on to answer each question. If the answer is correct, the teacher says "good answer" and proceeds to the next. If the response is incorrect or incomplete, he or she says, "No, that's wrong," and asks another child to answer. After the last answer, all the answer sheets are collected and graded.

The Double Agenda: Content and Cooperation

To begin the trees unit, each student is assigned to a three-person task group. Each group has a strong reader, an average reader, and a weak reader. Each student is assigned a specific role (reader, recorder, and checker). With the entire class, the teacher reviews each role's job, the team guidelines (one person talks at a time, use six-inch voices [voices that can only be heard by someone who is no more than six inches away from the speaker], use first names, no put-downs, stay with the group), and the lesson objectives (to identify the differences between hardwood and softwood trees and to practice teamwork).

TREES																									
1. The answers to these questions are in the science book. After your team has found the information to answer the question, each team member is to answer the question. After the recorder writes each answer, the team will agree on the best group answer. 2. Check that each team member can explain the group answer. 3. When finished, each person who helped should sign the worksheet. Team Name _____ Members _____ _____ _____ Date _____	1. Each person name one hardwood tree and one softwood tree. <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Hardwood</td> <td style="width: 50%;">Softwood</td> </tr> <tr> <td>A.</td> <td>A.</td> </tr> <tr> <td>B.</td> <td>B.</td> </tr> <tr> <td>C.</td> <td>C.</td> </tr> </table> Each team agree on at least three important characteristics of hardwood trees and three of softwood trees. <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Hardwood</td> <td style="width: 50%;">Softwood</td> </tr> <tr> <td>A.</td> <td>A.</td> </tr> <tr> <td>B.</td> <td>B.</td> </tr> <tr> <td>C.</td> <td>C.</td> </tr> </table> 2. Each person list at least one use of each tree type. <table style="width: 100%; border: none;"> <tr> <td style="width: 50%;">Hardwood</td> <td style="width: 50%;">Softwood</td> </tr> <tr> <td>A.</td> <td>A.</td> </tr> <tr> <td>B.</td> <td>B.</td> </tr> <tr> <td>C.</td> <td>C.</td> </tr> </table> Team: agree on which use of the trees is most valuable to your family. _____ _____	Hardwood	Softwood	A.	A.	B.	B.	C.	C.	Hardwood	Softwood	A.	A.	B.	B.	C.	C.	Hardwood	Softwood	A.	A.	B.	B.	C.	C.
Hardwood	Softwood																								
A.	A.																								
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Hardwood	Softwood																								
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Hardwood	Softwood																								
A.	A.																								
B.	B.																								
C.	C.																								

Figure 2 Trees Worksheet (Elementary School)

The teacher distributes one text and one worksheet to each group. He or she reviews the three-to-one questions on the worksheet and instructs the teams to read the text and agree on the answers.

After the teams finish the worksheets, the teacher asks a student from each group to share the group's answers. After several answers, each group's answer sheet is collected, signed by each member.

On the next day, the teacher gives each group a worksheet with the outlines of hardwood and softwood leaves. The teams stay together while the class walks through the nearby park. In the leaf hunt, each group is to find a sample leaf for each outline on the worksheet.

When the class returns from this trip, the groups paste the leaves to the matching sketch and each member signs the sheet. On the back of the sheet,

each group uses a scale of one to five to rate how well members worked together, how well each member did his or her assigned job, and how well they encouraged each other (see Figure 2).

The Triple Agenda: Content, Cooperation, and Complex Thinking

In this lesson, the teacher begins the study of trees by reading Joyce Kilmer's poem, "Trees." After the poem, students turn to a neighbor, "put two heads together," and decide how Kilmer felt about trees. While they are sharing, the teacher projects a large leaf on the overhead screen. After two minutes, he or she signals for their attention and asks for their decisions. He or she then announces that the class is going to make a leaf poem with their ideas, and asks that each group provide just one word to describe Kilmer's feelings. As each group in turn

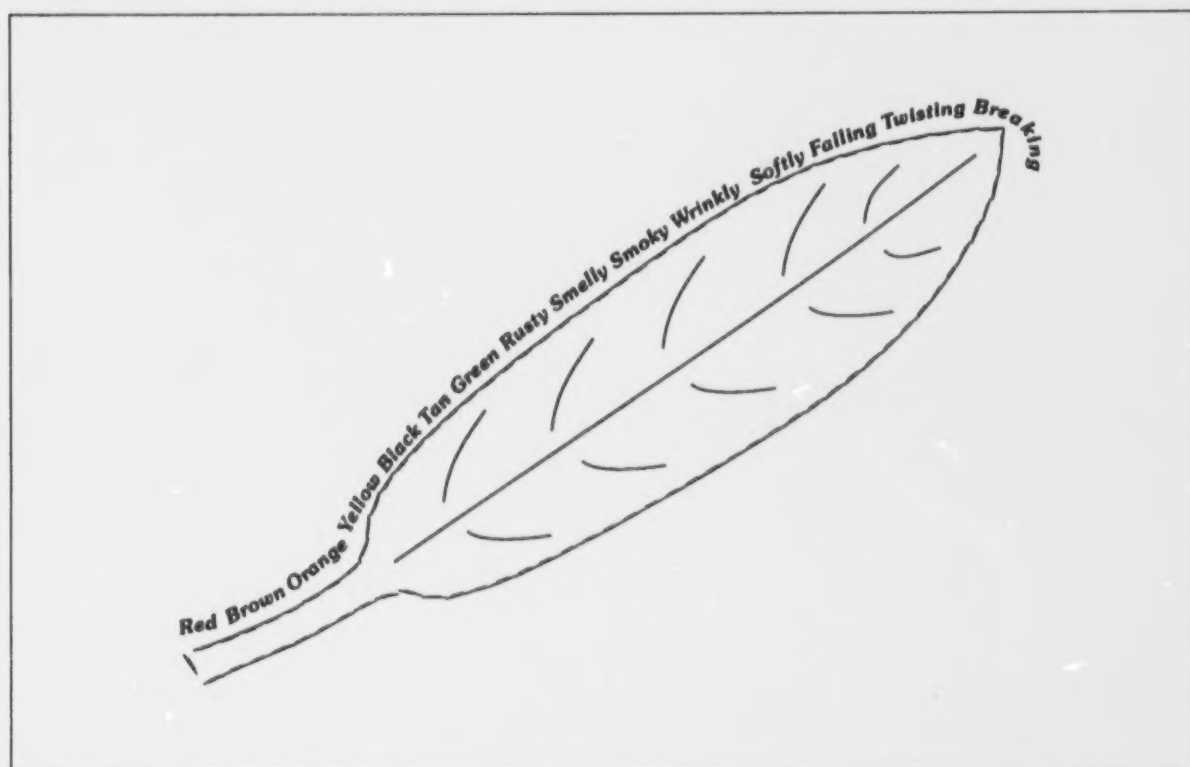


Figure 3 Leaf Poem

responds, the answers are written on the leaf outline (see Figure 3).

After the last contribution is made, the teacher uses a second overhead to outline the multiple lesson objectives.

- To know what makes a tree special.
- To show how trees are alike and different.
- To create a poem about a tree.
- To practice encouragement.

After checking for understanding about the objectives, the teacher divides the class into heterogeneous groups of three, assigns roles, reviews group guidelines, and reviews the encouragement T-chart (Bellanca & Fogarty, 1991). Each group's lab technician is invited to get a package of materials from a side table and share its contents with the group. (Each packet contains a piece of bark, a leaf, a seedling, a small limb, the tree name on a card, and a worksheet with the part names). The groups match the tree parts with

the worksheet. The teacher also reminds them to encourage each other.

Wandering among the groups, the teacher is able to help the groups, answer their questions, and observe how they encourage each other. When most of the students are finished, he or she signals for their attention and asks that the data collector in each group show its completed arrangement.

In the center of the room, there is a large sheet of newsprint showing a web labeled with the tree parts on the floor. The researchers from each group bring the labeled parts and glue them to the newsprint.

After the last piece is in place, the teacher asks students to explain what is similar about the objects on each ray and what is different. He or she probes and cues for small distinctions.

On the next day, the teacher directs a summary of the similarities and differences between the various trees to bridge into a discussion of the distinction between hardwoods and softwoods. The class

OBSERVATION WORKSHEET						
Sample	1	2	3	4	5	6
Shaving	easy	hard	hard	easy	hard	easy

Figure 4 Trees Unit Observation Worksheet

observes as the teacher uses a penknife to shave each limb sample. After the samples are shaved, the groups are asked to agree whether the job of shaving was hard or easy (see Figure 4).

The technicians share the results. Where there is disagreement among groups' answers, simple voting is used to resolve the conflict. After the last agreement is reached, the teacher facilitates a summary of what the students have learned by a series of open-ended questions based on the web. These questions then lead to the labeling of the hard-to-shave samples as hardwood and the easy-shaving limbs as softwood. To conclude, the students in

each group are asked to complete a prediction chart (see Figure 5).

After ten minutes, the groups are called back to work as a whole class. In turn, each group gives its response to an item on the chart. Other groups then agree or disagree. Where there is disagreement, students are encouraged to give reasons and persuade. When the entire group agrees on a response, the class moves on to the end. The teacher concludes this activity by correcting mistaken predictions, affirming correct predictions, and soliciting generalizations about hardwood and softwood.

PREDICTION CHART	
Hardwood	Softwood
Will burn longer Will give more ashes after burning Will last longer on a house	Will saw faster Will take a nail more easily Will split more easily with an axe

Figure 5 Trees Unit Prediction Chart

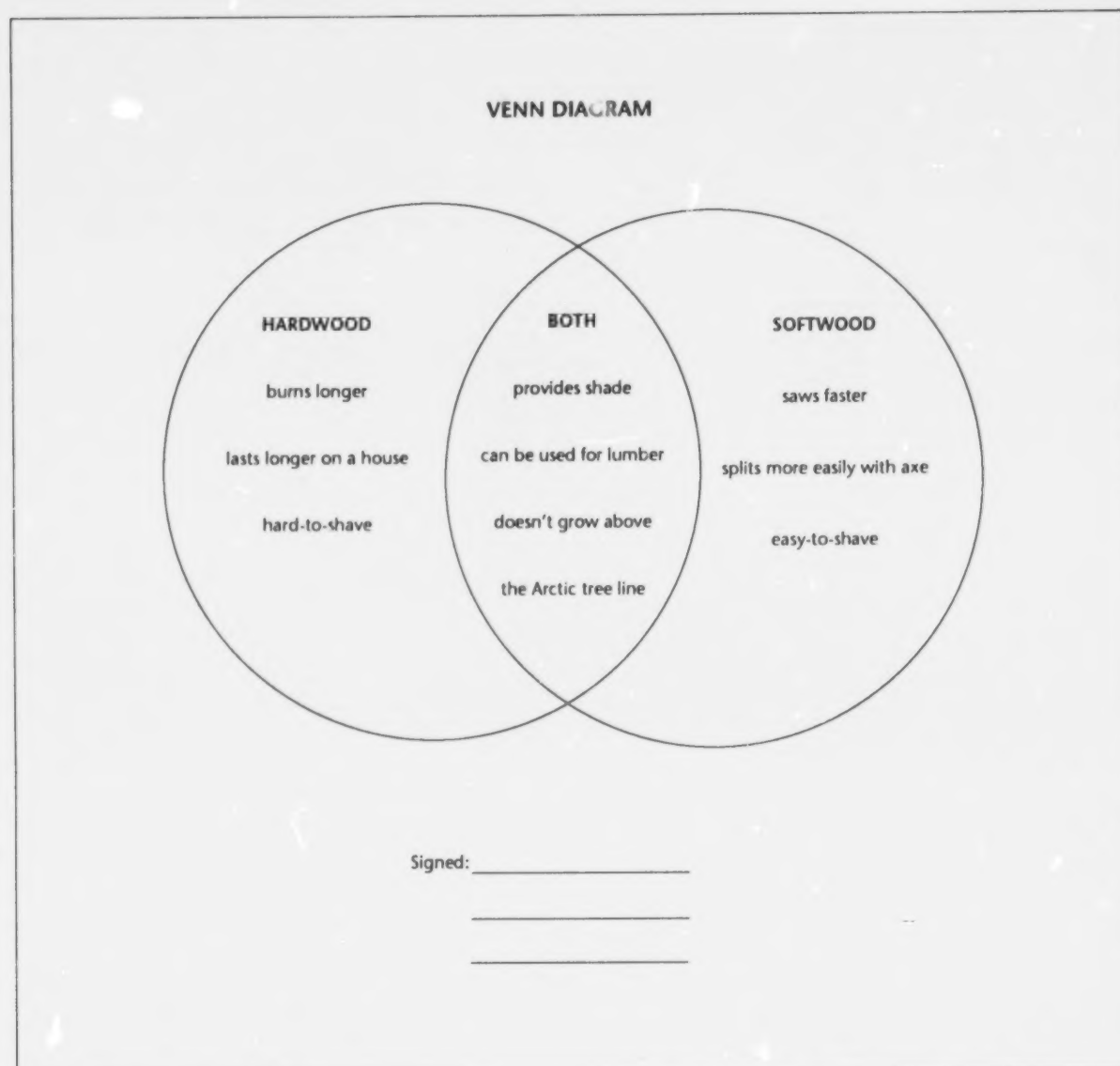


Figure 6 Trees Unit Venn Diagram

On the next day, the teacher models how the students can create a Venn diagram to compare and contrast hardwood and softwood trees. Then each group works on its diagram and signs its completed work (see Figure 6).

After checking the groups' work, the teacher re-reads the Kilmer Poem and the class's leaf poem created at the start of the lesson. Each group reviews what it has learned about the unique qualities of all trees and the differences between hardwood

and softwood trees. Students then create a tree poem with that information.

Each group uses a sheet of newsprint and crayons for the paper poem. The teacher informs students that he or she is going to observe how well they work together, encourage each other, and how accurate the information that the group uses is. He or she also lets students know that each individual in each group should be ready to explain why the group has used the selected information.

ELEMENTARY INSTRUCTIONAL STRATEGY

SINGLE AGENDA LESSON

(Content Only):

- selected students read text aloud
- individuals answer chapter questions
- selected students read aloud
- positive reinforcement

DOUBLE AGENDA LESSON

(Content and Cooperation):

- assigns heterogeneous groups
- assigns roles in group
- reviews roles and guidelines for cooperation
- identifies cooperation and content objectives
- three-to-one worksheets reviewed
- group signatures
- reviews group answers
- team worksheet for leaf search
- group rating
- group agreement activity

TRIPLE AGENDA LESSON

(Content, Cooperation, and Complex Thinking):

- | | |
|--|--|
| <ul style="list-style-type: none"> • Think, Pair, Share set (Bellanca & Fogarty, 1991) • model leaf poem • group wrap around (Bellanca & Fogarty, 1991) • overhead to review content, cooperation • cognitive objectives • check for understanding • assigned heterogeneous groups with roles • reviews roles, group guidelines, and encouragement T-chart (Bellanca & Fogarty, 1991) • distributes prepared packet to each group • monitors • web for entire class | <ul style="list-style-type: none"> • questions similarities • differences • probing questions • teacher-directed summary by groups • conflict resolution—voting • prediction chart • agree/disagree discussion • Venn diagram for compare and contrast group task • groups make own leaf poem • observation for encouragement during group task • random quizzing of knowledge; tests individual ability to explain material. |
|--|--|

Figure 7 Elementary School Instructional Strategy

The three ingredients—knowledge of trees, observed encouragement, and the ability to explain serve as the “test” (see Figure 7).

What becomes readily apparent in the triple agenda classrooms is that the most skilled teachers are able to cover the same amount of material and to engage each child's active thinking about the topic with interest and variety. By purposefully preparing their

students to incorporate the triple agenda, teachers create learning conditions conducive to complex thinking about the content without losing time to off-task misbehavior. In the single agenda lesson, the teachers lose time when disinterested students lose concentration and distract each other.

The challenge of the triple agenda classroom is the careful preparation of the students with the

CREATING COOPERATIVE LEARNERS

"shareware" (the tools and skills to work cooperatively) and the "mindware" (the tools and skills for thinking) needed to achieve the cooperative and cognitive objectives with the content objectives. This means that the triple agenda teacher must take time at the year's start to frame the conditions for cooperation and complex thinking and to provide instruction in the skillful use of shareware and mindware. Although time devoted to mindware and shareware instructions eats away at allotted time early in the school year, that time enables the teacher to move at least as quickly—and more completely—into the content as the year progresses. Time ordinarily lost in the single agenda classroom to the discipline problems of unengaged and often bored students is recaptured by the skillful cooperation and the active, self-directed mental engagement of students well prepared to work together and to engage each other in thoughtful tasks. In the thoughtful classroom, the students know that they are individuals accountable not only for content mastery, but also for how well they use their cooperative and cognitive skills. Moving beyond superficial coverage of facts the teacher has the opportunity to delve into critical concepts as well.

In this context, cooperative learning opens windows of opportunity not found in a content-only classroom. If needed, the teacher can intensify instruction in the cooperative social skills as the means to help students become more caring and more cooperative with each other. Without changing the direction of the curriculum, he or she can focus on the cooperative development of one or more students by expanding or contracting the time spent in learning the cooperative skills.

As the teacher guides students toward conceptual objectives in the content, the teacher will have the chance to bond students into high-trust teams that support each member. No longer is the teacher the sole motivator; students begin to help each other.

To picture the effect of the triple agenda, imagine a crew preparing for a rowing race. The coach takes great care to teach each member the technique of synchronized rowing. Each member has a job. In the beginning of the session, the members

struggle to flow with the team. With practice, coaching, and more practice, the team members learn to pull together, to row as a unit.

The cooperative classroom with the learning groups is very much like the rowing team. The teacher not only shows the students how to row (the content); he or she also teaches them how to work as a team (cooperative skill). Practice and coaching of the rowing and teamwork go hand in hand. Success is measured by how well the students row together; the most powerful teams are those that master the double agenda.

Explanations of cooperative learning often miss this salient point. Traditionally, the arguments outlining the benefits of cooperative learning point out the achievement successes and the future work benefits of the teamwork to the creative classroom climate. This improved climate fosters internal motivation, accelerates learning, and makes traditional discipline problems less problematic. It may well be argued that teachers who take the time to teach students how to work, solve conflicts, and make decisions in small cooperative groups, make their own jobs easier and provide themselves with the time to accomplish their primary career agenda—teaching every child.

The effects of serious cooperative learning—concentrated instructional time devoted to the double agenda—extend beyond the classroom. Cooperative learning offers another, often missed, benefit—a cooperative school climate. To feel this effect, one need only visit a school dedicated to the cooperative model such as ones found in Chicago Heights, Illinois; Parkersburg, West Virginia; Lawton, Oklahoma; or Rockford, Illinois.

A visitor walking into any of these schools—all serving more than 85 percent Chapter I students—will *feel* the difference. The tone goes beyond posted mission statements on the entrance doors, bright bulletin boards celebrating student and teacher achievements, and drug-free school posters. The visitor will observe the easy way "big sisters" and "big brothers" mentor their primary grade partners with smiles and laughter; the cooperative games that include every student on mixed-age teams during recess; the cafeteria-table teams earning points together for cooperative lunch-time

behaviors; the schoolwide goal of 1000 recorded encouraging words or actions a month; weekly goal-setting activities by base teams in every classroom; and sample after sample of students encouraging and helping each other throughout the building. In spite of the fact that most students in these schools live in poverty, surrounded by drugs, crime, and family dysfunction, the focus in every classroom is on cooperative work as the base of learning. In the earliest grades, the children learn how to move in and out of groups; how to care for each other; and how to work as a team in the classroom, hallways, cafeteria, playground, gym, and bus lines. Students in these schools avoid negative put-downs ("nerd," "jerk," or "stupid"), competitive criticisms ("you idiot, why can't you..." or "she can't do anything right"), foul language (no examples needed!), and rejections ("Do we have to work with him?" or "Why does she have to be in our group?"). Instead, students seldom forget to give each other and their teachers positive recognition ("Good job"), encouragement ("This is hard but we can do it if we work together"), and support ("We'll do it together"). As a result, students in the schools are bound with the feeling of "one for all, all for one" not only in classroom groups, but across grade levels.

The schoolwide cooperative goals impact the faculty as well. When cooperative learning methods are used to develop the students' social skills and the classroom's social climate on a consistent basis, a teacher can expect significant gains in students' basic skills. These gains are most dramatic when the social skills are taught first independently and then embedded into basic skill instruction. In a sense, the students learn the cooperative social skills in "spring training" and apply them in the "regular season." In the regular season, the teacher as coach continues to help students refine social skills. As students work together "in the game," the teacher gives feedback on their cooperation and elicits their assessment of team progress.

While the evidence is clear about the potential for cooperative learning—especially when it inculcates serious integration of the social skills into the curriculum as advocated by Johnson and Johnson, or schoolwide as advocated by Cohen, Kohn,

Bellanca, Fogarty, and Burke—it falls short of this potential if it is not combined with strategies to help all students become complex thinkers and problem solvers in triple agenda classrooms.

The triple agenda classroom works best in a schoolwide context. In this context, every teacher purposefully endeavors to help each student become a mindful learner. This suggests that thinking, along with cooperating and content mastery, is a critical component of each instructional day. Thinking in this sense, however, is not something that just happens or occurs in isolation from the cooperation and content. All three are treated as a single approach to instruction. (Returning to the sports analogy, the triple agenda teacher/coach does not isolate thinking instruction to a special period each day. As with the cooperative social skills and group learning procedures, she or he introduces students to the thinking skills and problem-solving processes appropriate to their level. This begins in "spring practice." After the students learn the new plays, they go into "the regular season" where the games count. The teacher helps each student perfect the skills. In the triple agenda classroom, the teacher also may make use of the team spirit. Students are encouraged to help each other with feedback and support. The more each individual masters the game, the greater the chance for team success.

From a practical point of view, the students' cooperative skills are the chief enablers of complex thinking in the classroom. If a teacher has to take the time to hear how each student in a classroom is progressing and to read and analyze each assignment, paper, or project, one-by-one; current time limits require either superficial evaluation, long time lapses between assignment collection and assignment return, or huge time investments. When students are able to function skillfully in thoughtful and challenging tasks, having mastered cooperative learning and complex thinking, the teacher spends considerably less time on off-task diversions and considerably more in-class time on coaching both individuals and groups. Does a slower student need a new explanation? A review of the problem-solving process in use? A word of encouragement? Do the three fastest learners need more difficult problems

to solve? More in-depth feedback? A special team project applying complex principles? A cooperative learning teacher has the time to provide for these needs.

Just as the double agenda impact is increased when it becomes a schoolwide goal, the triple agenda increases its impact when the entire school integrates complex cognition into the curricular fabric. Indeed, there is some indication that when cognitive instruction is added to cooperative and content learning, the results are exponential rather than additive. This means that all students not only cover more content, but also understand it more deeply and apply it more accurately.

Looking back at the common definition of cooperative learning as a group of students of mixed ability working to achieve a common goal, it is apparent that the definition is both simple and profound. In its simple sense, cooperative learning is an instructional tool, one among many, that can help most students obtain better test scores on the basic skills of reading or math. In the more profound sense, it is an instructional model, which, when integrated with cognitive instruction and curricular content, provides a school with multiple opportunities to better prepare all students for learning and living in the twenty-first century.

REFERENCES

- Bellanca, J., & Fogarty, R. (1991). *Blueprints for thinking in the cooperative classroom*, (2nd ed.). Palatine, IL: Skylight Publishing.
- Cohen, E. (1986). *Designing groupwork: Strategies for the heterogeneous classroom*. New York: Teachers College Press.
- Costa, A. (1991). *The school as a home for the mind*. Palatine, IL: Skylight Publishing.
- Gibbs, J. (1987). *Tribes: A process for social development and cooperative learning*. Santa Rosa, CA: Center Source Publications.
- Glasser, W. (1986). *Control theory in the classroom*. New York: Harper and Row.
- Johnson, D., & Johnson, R. (1987). *Learning together and alone: Cooperative, competitive, and individualistic learning*. Englewood Cliffs, NJ: Prentice-Hall.
- Johnson, D., & Johnson, R. (1979). Conflict in the classroom: Controversy and learning. *Review of Educational Research*, 49, 51-70.
- Kagan, S. (1990). *Cooperative learning resources for teachers*. San Juan Capistrano, CA: Resources for Teachers.
- Kohn, A. (1986). *No contest: The case against competition*. Boston: Houghton Mifflin.
- McTighe, J., & Lyman, F. (1988). Cueing thinking in the classroom: The promise of theory-embedded tools. *Educational Leadership*, 45(7), 18-24.
- Slavin, R. (1983a). *Cooperative learning*. New York: Longman.
- Slavin, R. (1983b). When does cooperative learning increase student achievement? *Psychology Bulletin*, 94, 429-445.

SECTION THREE

ASSESSING SIGNIFICANT OUTCOMES

A friend of ours who is a fifth-grade teacher in California declared that she was not going to teach her music this year. Knowing that the fifth grade United States history curriculum included a unit on the westward expansion, and that our friend was very fond of playing her guitar and singing songs of the new frontier with her students, we were puzzled. We wondered why she had made the decision to exclude the music component.

"Because," she countered, "my students are not being evaluated on how well they enjoy or know music. They are being evaluated on how well they are mastering reading, writing, and mathematics!"

This last section addresses the complex task of assessment. Whether aesthetic, scientific, technological, educational, or physical, there is a strong desire for feedback in any human endeavor. We want to know how well we did, if it worked, and we want to know the results. With new and more complex goals on the agenda for educating the citizens of the 21st century, the question is: How will we know that these new goals are being achieved?

This final section begins with a reassessment of assessment itself. Two premises are set forth. First, we cannot measure these new process-oriented goals with product-oriented assessment techniques. Second, changing the forms of assessment can be used as an influential tool and significant impetus for restructuring schools—what is inspected is what is expected; what is tested is what is taught.

Following this reassessment, a renaissance in practices is envisioned. One chapter examines the issue of "finding out what we need to know," while another chapter takes a pragmatic look at grading as one compelling component of assessment that continues to haunt the student, the parent, and the teacher. Still another chapter espouses a more liberal approach of evaluation as an ongoing collaborative process for the student, parent, and teacher. Further chapters elaborate on methods and models for assessing and provide a strategic planning process for systematic assessment as well as one way to actually track student transfer of learning.

REASSESSING ASSESSMENT

Arthur L. Costa and Bena Kallick

The task of curriculum designers usually involves three major decisions: (1) establishing the outcomes or goals of the educational enterprise, be it at the classroom, school, district, state, or national level; (2) designing the delivery system by which these goals will be achieved, including instructional design, materials selection, allocation of time, and placement of learnings; and (3) developing procedures to monitor and evaluate the achievement of our goals as a result of employing that delivery system. Curriculum alignment means that these three groups of decisions are consistent with each other; it means that our delivery system is designed to meet desired outcomes and that our assessments evaluate the established goals (see Figure 1).

In the curriculum alignment process, sound educational practice dictates that the first group of decisions—the goals—drives the system. Like it or not, what is inspected is what is expected; what you test is what you get. The traditional use of norm-referenced, standardized tests has dictated what should be learned (the goals) and has influenced how it is taught (the delivery).

As evidenced in the preceding chapters, educators realize that new goals for the next century are

becoming increasingly necessary for our children's future, for the continuity of our democratic institutions, and even for our planetary existence. Such goals include:

- Capacity for continued learning,
- Knowing how to behave when answers to problems are not immediately apparent,
- Cooperativeness and team building,
- Precise communication in a variety of modes,
- Appreciation of disparate value systems,
- Problem solving that requires creativity and ingenuity,
- Enjoyment of resolving ambiguous, discrepant, or paradoxical situations,
- Organization of an overabundance of technologically produced information,
- Pride in a well-crafted product,
- High self-esteem, and
- Personal commitment to larger organizational and global values.

These new goals need to drive the curriculum alignment process in thoughtful schools of the future. The delivery system—curriculum materials,

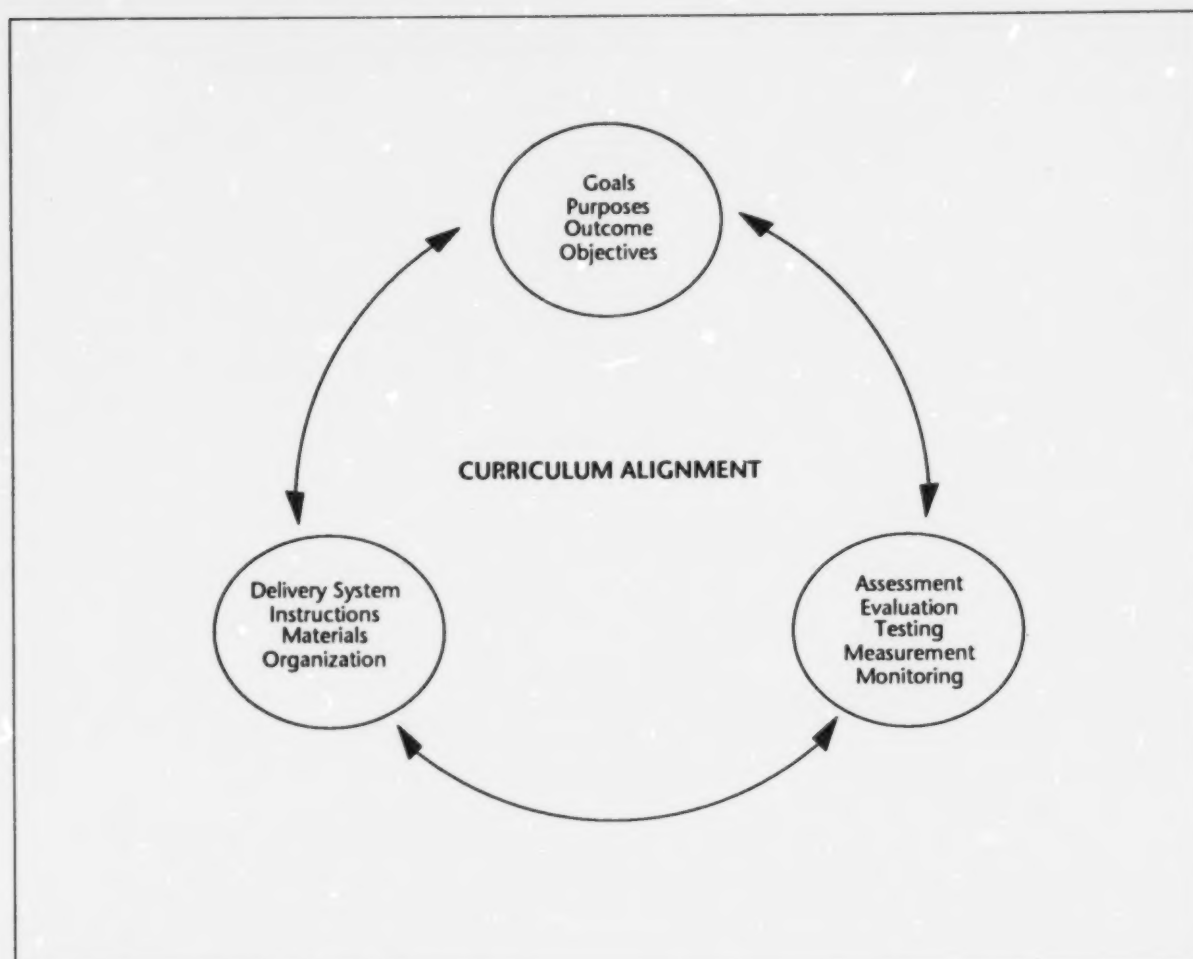


Figure 1 Research Outcomes of Cooperative Learning

instructional strategies, school organization—and the decision-making processes employed need to embody these goals. Furthermore, these goals are valid not only for students but for all of the school's inhabitants.

Likewise, our methods of assessment must be transformed to become more consistent with our new goals. We cannot employ product-oriented assessment techniques to assess the achievement of these new, process-oriented educational outcomes. Standardized test scores give us a static number that reflects the achievement and performance of isolated skills at a particular moment in time. Thinking, however, is dynamic; we learn from experience, react emotionally to situations, exper-

ience power in problem solving, and are energized by the act of discovery. Thus, testing thinking may indeed be an oxymoron.

We are witnessing a nationwide surge to "go beyond the bubble" of standardized, norm-referenced, computerized testing (California State Department of Education Curriculum Assessment Alignment Conference, 1989). State departments of education (including New Jersey, Vermont, Colorado, Maryland, Michigan, and Illinois) are providing leadership by experimenting with and advocating innovative assessment methods such as writing samples, materials manipulation, open-ended multiple answer questions, portfolios, performances, and exhibitions.

Such innovative methods are more useful than traditional testing procedures for several reasons. First, they resemble the situations in which real problem solving and creativity are demanded; they are not contrived. Second, they allow teachers to more accurately diagnose students' abilities. Third, they take place during instruction rather than after instruction is completed. Furthermore, they provide more immediate results that assist teaching teams in evaluating the effectiveness of their own curriculum decisions and instructional efforts. Finally, they provide "real-time" feedback to students themselves who must become the ultimate evaluators of their own performance.

To ensure the success of new assessment efforts in the restructured school, educators need to address at least the following six tasks:

1. Re-establish the school-site team as the locus for accountability.
2. Expand the range, variety, and multiplicity of assessment techniques.
3. Systematize assessment procedures.
4. Re-educate legislators, parents, board members, and the community.
5. Any assessment of student performance must also include an assessment of school and classroom conditions.
6. The process of evaluation will become internal for students.

RE-ESTABLISH THE SCHOOL-SITE TEAM AS THE LOCUS FOR ACCOUNTABILITY

For too long the process of assessment has been external to teachers' goal setting, curriculum, and instructional decision making. School effectiveness, student achievement, and teacher competence have often been determined by a narrow range of standardized student achievement test scores in a limited number of content areas: reading, math, and language acquisition. Awards of excellence have been granted to schools that show the highest gains in scores. Teachers have been given merit pay based on their students' performance on standardized tests. Test results have been

published in rank order in newspapers. (The real-estate industry loves this: "This is a ninety-eighth percentile community," say the agents. Houses are priced accordingly.)

Lord Kelvin said, "When you cannot measure it; when you cannot express it in numbers, your knowledge is of a very meager and unsatisfactory kind." Based on this archaic, reductionist theorem, we have tried to translate our educational goals into observable, measurable outcomes. We have become fascinated and enamored with:

- The amount of time spent on a task,
- The number of questions asked at each level of Bloom's Taxonomy,
- Score gains on achievement tests,
- Class size: numbers of students or the ratio of students to adults,
- Length of time in school,
- I.Q. scores as a basis for grouping,
- Numbers of days in attendance,
- Minutes of instruction,
- Percentages of objectives attained,
- Numbers of competencies needed for promotion, and
- School effectiveness judged by published test scores.

In the process, teachers have become disenfranchised. Educators in the classroom have had little say about what tests measure. In fact, what tests do measure is usually irrelevant to the curriculum, and the results of testing disclose little about the adequacy of teachers' decisions. In many ways the desire for measurable outcomes has signaled teachers that they are not competent to assess students themselves. The message is that they can not be trusted to collect evidence of student's growth, that the observations they make daily in the classroom are suspect and of little worth.

The accountability movement has caused educators to search for "hard data" by which to assess their efforts. What teachers observed, therefore, was "soft data." We propose that the "hardest," most objective data available is collected by an en-

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lightened teaching team which systematically and collectively gathers data over time in the real-life, day-to-day interactions of the classroom. Conversely, the most suspect data is that designed and collected by testing "experts" external to the school setting and ignorant of the school's mission, values, and goals; the community's culture and socioeconomics; and the classroom mix of learning styles, teaching strategies, and group dynamics in which their tests are administered.

Someday we will reflect on this era and think: "What was educationally significant but difficult to measure was replaced by what was insignificant but easy to measure." Someday we will realize to what extent we've measured our effectiveness at teaching what is no longer worth learning! To paraphrase Jacob Viner, "When you can measure it, when you can express it in numbers, your knowledge is still of a meager and unsatisfactory kind!"

In the restructured school, accountability will be relevant to the staff because it will be used as feedback and as a guide to informed and reflective practice. Staff members will need training to learn how to design ways of gathering such data, establishing criteria for judgment, and working together to develop their common understanding, reliability of observations, and reporting of results.

EXPAND THE RANGE, VARIETY, AND MULTIPLICITY OF ASSESSMENT TECHNIQUES

For too long we have relied on a limited range of acceptable measures, primarily paper-and-pencil tests. Enlightened, skillful teachers—being the best collectors of data about student's growth toward the process goals of the restructured school—are able to observe students daily in problem-solving situations that demand performance of the goals of the restructured school: cooperation, problem solving, and creativity. This requires an expansion of our repertoire of assessment techniques including:

- Direct observation of student performance in problem-solving situations,

- Collecting portfolios of selected student work over time,
- Observing performance in extended projects,
- Inviting students to keep logs or journals,
- Interviewing students about their own self-concept and perceptions of themselves as learners,
- Making videotapes of student interactions,
- Collecting writing samples over time,
- Keeping checklists recording indicators of dispositions and habits of mind exhibited during group projects and discussions,
- Assessing student displays, exhibitions, and performances according to a set of agreed-upon criteria,
- Inviting students to display thinking skills using graphic organizers,
- Engaging in child study by keeping anecdotal records,
- Recording critical incidents: vignettes, sayings, and uses of terminology which indicate transfer, application, and internalization of concepts and strategies,
- Keeping checklists, logs, diaries, and journals about students,
- Employing technology to assist in collecting and recording information about students over time.

SYSTEMATIZE ASSESSMENT PROCEDURES

Skillful teachers already assess their students in many of the above ways. Teachers can describe students' progress: the lights that go on in students' eyes; the voice inflections of students when they've "got it," or the "a-ha" of discovery in students' exuberance. These reflect the collaborative sharing and interdependence of group work; the serendipitous application of skills and concepts beyond the context in which they were learned; and the reports from parents and other teachers of learnings applied.

What is lacking is a systematic way of collecting and reporting such evidence. Staff members need to refine their skills of observation and work for assessment that is reliable independent of the specific assessor. They need to identify and define terms and adopt common goals. They need to continually scrutinize the curriculum to ensure that goals, instruction, and assessment are aligned. Teachers, parents, administrators, and students all will need to see clearly the school's objectives and purposes, and all will become more involved in collecting data, revising perceptions, and realigning practices.

Limitations of time and communication in school settings often prevent teachers who work in different departments, grade levels, and disciplines from meeting together. The mutual support, continuity, reinforcement, and assessment of these new goals of the restructured school throughout the grade levels and across the subject areas has yet to be accomplished. Critical reading, the scientific method, problem solving, modes of inquiry, and study skills can be applied to mathematics, literacy, or numeracy. The distinctions and connections are still vague, however, when deciding which skills should be taught in a particular discipline and how they all fit together.

Until we consider thinking as the core of the curriculum and that content should be selected or rejected based on its contributions to the thinking and learning process, we shall continue to endure this dilemma. The sooner we admit that these new processes have become the content, the sooner we will find ways of infusing and assessing these goals throughout the curriculum. Our obsession with content is what holds us back.

RE-EDUCATE LEGISLATORS, PARENTS, BOARD MEMBERS, AND THE COMMUNITY

As a goal of education, the development of the intellect is not yet valued or understood by the majority of the public. Business and industry leaders are increasingly supportive of schools' en-

deavors to educate the future generation to become better individual and group problem solvers, to develop creative capacities, to be open to new and continued learning, and to work cooperatively in teams. However, there are still legislators, governors, school boards, and even an "education president" who fail to include thinking, creativity, and cooperation in our national goals for the twenty-first century.

Educators have allowed the public—parents, school boards, legislators—to use these scores to evaluate their schools, students, and teachers without helping them see that other, more significant nonmeasurable objectives can also be documented using a variety of reliable sources and techniques. Political decisions about testing, schooling, curriculum, and teacher competencies need to give way to sounder educational principles.

Educators, in conjunction with test makers, textbook publishers, professional organizations, business and industry leaders, parents, and the media, need to mount a massive information and educational program to shift public policy and national values toward support of more rational, cooperative, and compassionate public education.

Any assessment of student performance must also include assessment of school and classroom conditions. The conditions in which people work send powerful signals as to the values, mission, and purposes of the institution. Jack Frymier (1987) writes:

In the main, the bureaucratic structure of the workplace is more influential in determining what professionals do than are personal abilities, professional training, or previous experience. Therefore, change efforts should focus on the structure of the workplace, not on the teachers. It can be assumed that teachers will more likely teach for thinking, creativity, and cooperation if they are in an intellectually stimulating, creative, and cooperative environment themselves.

We must therefore also assess the quality of the environment in which teachers, students, and administrators operate. We must constantly monitor the intellectual ecology of the workplace to insure

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that intellectual growth for all the participants does not become endangered, or worse, extinct.

Some questions by which to assess the intellectual ecology of the school environment include:

- Have curriculum materials been developed and materials adopted to support thinking, cooperation, creativity, and the other new goals of the restructured school?
- Are the reward systems for students and the teacher evaluation system aligned with the new values and mission of the restructured school?
- Do the communications—such as report cards, newsletters to parents, school mottoes and logos—reflect the values of the restructured school?

The process of evaluation will become internal for students. We must constantly remind ourselves that the ultimate purpose of evaluation is to have students become self-evaluating. If students graduate from our schools still dependent upon others to tell them when they are adequate, good, or excellent, then we've missed the whole point of what education is about. The highest level of Bloom's Taxonomy (1956) is generating, holding, and applying a set of internal and external criteria. For too long, adults alone have been practicing that skill. We need to gradually shift that responsibility to students. Our goals for the restructured school must be to help students develop the capacity to modify themselves.

REFERENCES

- Archibald, D. A., & Newmann, F. (1988). *Beyond standardized testing: Assessing authentic academic achievement in the secondary school*. Reston, VA: National Association of Secondary School Principals.
- Arter, J., & Salmon, J. (1987). *A consumer's guide: Assessing higher order thinking skills*. Portland, OR: Northwest Regional Laboratory.
- California State Department of Education Curriculum Assessment Alignment Conference. (1989, October 16). Sacramento, CA.
- Costa, A. (1991). Assessing growth in thinking skills: Part VIII. In A. Costa (Ed.), *Developing minds: A resource book for teaching thinking*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Bloom, B. S. (Ed.). (1956). *Taxonomy of educational objectives, Handbook I: Cognitive domain*. New York: David McKay.
- Frymier, J. (1987, September). Bureaucracy and the neutering of teachers. *Phi Delta Kappan*, p. 10.
- Norris, S., & Ennis, R. (1989). *Evaluating critical thinking*. Pacific Grove, CA: Midwest Publications.
- Perrone, V. (1991). *Expanding student assessment*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Stiggins, R., Rubel, E., & Quellmalz, E. (1986). *Measuring thinking skills in the classroom: A teacher's guide*. Portland, OR: Northwest Regional Laboratory.
- Worthen, B. R., & Sanders, J. (1987). *Educational evaluation: Alternative approaches and practical guidelines*. White Plains, NY: Longman.

FINDING OUT WHAT WE NEED TO KNOW

—
Sharon Jeroski

Evaluation is much more than a way of monitoring change—it is the single most powerful way in which teachers communicate their values and beliefs to students, parents, and colleagues. The way we look at evaluation is connected to the way we look at and interact with the world around us. The issues we encounter as we assess and monitor changes in our students reflect fundamental issues in education; these issues, in turn, are shaped by the concerns of larger communities.

Until relatively recently—two to three hundred years ago—education in most of the Western world was largely a private undertaking. Children of prominent families developed the skills and knowledge they needed to take their expected places as leaders in the church, state, or the military. Their evaluation was almost entirely based on their performance in dynamic and interactive situations—on their abilities to speak informatively and persuasively and to draw on the knowledge they had acquired to illuminate moral or strategic issues. As participation in schooling increased, the goals of education expanded and reflected the prevailing view that children were not inherently “good”—that they had to be instructed and shaped

in order to assume a proper moral character. Evaluation, quite logically, focused on the state and condition of children’s minds, and was often undertaken by clergy or other members of the community known to be of high moral character. They visited the schools to listen to recitations, to interview and inspect the children. This view prevailed until the close of the nineteenth century, when Western societies embraced the scientific paradigm. The zeal for empiricism, combined with the increasing universality of education, focused attention on a new role for schools: sorting students to determine their appropriate role in society. Evaluation focused around such quantitative measures as the intelligence test and “objective” written measures of achievement that held the promise of identifying the appropriate role for each student. In this century, schools in North America have reflected both the intuitive appeal of egalitarianism and the success of assembly-line industry. Schools have been expected to “produce” students who acquire set content and master specific skills. In this reductionist approach, evaluation is largely a matter of quality control—of monitoring the “products” to ensure that they met standard specifications.

Today, as we approach the twenty-first century, the information age is shifting the influences that shape our views of education. New interest in the integrated nature of knowledge, in the connectedness of our world, in systems and patterns, and in networks and teams pervade science, economics, ecology, business management, and, of course, education. And, quite logically, the emphasis on evaluation is shifting from monitoring, which is largely a managerial function, to supporting learning and enhancing development, a learner-focused orientation.

Of course, the two functions—monitoring and enhancing—are not mutually exclusive. By monitoring development, teachers and students are able to make informed decisions about teaching and learning. But effective evaluation can also shape learning when teachers and students work together to focus on what they really value about themselves as powerful learners and thinkers.

EVALUATING WHAT WE VALUE

"It's almost like we've been on a journey in connections," Robert explains.

"Yes," Ronsor chimes in; "Just in a period of time—not even half a year—we've been on a learning journey from not even thinking about connections to now, where we can connect anything!"

"Can you remember how you got started on connecting?" their visitor asks.

"It was Mrs. O.—it was when we came to Mrs. O.'s room that the connecting started," Daniel suggests.

"I remember!" offers Jason. "First we brainstormed connections—all the connections we could think of—and then we represented them!"

"I did a dinosaur skeleton with the bones connected!"

"I showed how Lego connects to make things!"

"My first one was a truck pulling a trailer."

"I showed a pen with a top that connected to it."

"Then we had the connecting chain," Alli remembers. "Whenever anyone made a connection they put

their initials on a piece of paper and made a new link in our connecting chain."

"And we wrote our connections, too," Tara adds, "and put them in our special connections jar—do we still have that?"

"And we did connecting journals, too. But pretty soon we didn't need to do that—we just made connections all day long," Ronsor explains, "and now we mostly connect ideas."

Jason nods, "We've sure changed—last October we could only connect things."

"You know," Aerhyn says, "connections are hard to think and connections are easy to think. And when you fill up with new information, your brain takes each piece and sorts into hard connections and easy connections."

"Do connections help you learn new things?" asks Mrs. O. "When there's something that you almost know does it help to connect it to something you already know?"

"I think so," Alli agrees, "and when you're learning and it's hard, you've just got to keep thinking for the connections—like I did with regrouping."

"I notice that you all seem to have a signal for connections—you lace your fingers together. How did that start?" asks the visitor.

"Well, I think we saw Mrs. O. do it first," Ronsor explains, "and she was our role model. It's good because sometimes if we're watching a videotape or something and it's not appropriate to talk, we can still show our connections silently."

Aaron nods and shows the connection symbol: fingers on the right hand interlaced with fingers on the left.

"And in writing, Mrs. O.'s given us a new connections symbol for our reflections. Sometimes we circle the one that tells about our work that time, but sometimes we just draw the circles ourselves." Robert displays the "connecting scale"(see Figure 1).

These seven-year-olds value connections. Their teacher, Kim Ondrik, believes that helping them make connections will help them to become more independent and powerful thinkers. As the chil-

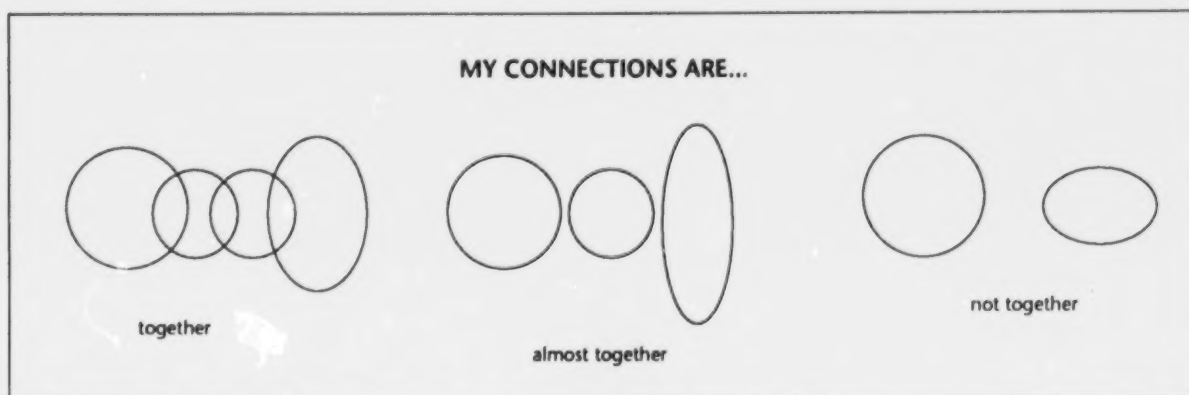


Figure 1 Kim's Connecting Scale

dren explained, they began with concrete representations, extensive modeling, and discussion. Now, six months later, they say, "We can connect anything!" They continually monitor their connections. As they discuss classroom behavior, books, arithmetic, their writing, and themes such as families, they frequently announce, "I have a connection," or silently lace their fingers together. When one group of children was called for music, Tara announced, "I have a connection. Wendy, Wednesday, and Wu start the same—that's alliteration." They also evaluate their own development in terms of their connections. They don't talk about what they don't know or what they can't do; instead they explain that not all of their connections are together. For example, Eric, who is six, describes his learning:

My connections are together for dinosaurs and space. They're almost together for diplodocus, for writing, and for reading. But my connections for math are not together yet.

As Kim observes and conferences with the children, she notices that they are developing increasingly complex and sophisticated connections and often notes evidence that they:

- notice patterns,
- make connections between classroom activities,
- make connections to out-of-school experiences,
- enjoy exploring and finding new connections,

- refer to previous activities, and
- connect their experiences with the literature they read.

Learning, instruction, and evaluation are integrated and purposeful in Kim's classroom. Everyone knows what is valued, and this knowledge helps them to focus on key aspects of their own thinking and learning. See, for example, these values reflected in Kelsey's self-representative cluster (Figure 2).

Teachers sometimes feel that the amount of information they need to note and record is overwhelming—particularly as they move toward the kinds of qualitative information that develop through conferencing and observation. Setting priorities is difficult, but clearly establishing and sharing your priorities makes evaluation manageable. Many teachers, like Kim, choose three or four key aspects of children's development to focus on. They explicitly identify the behaviors they want to see "more of, more often"—not so much as outcomes but as "outcomings" of their programs. For example, one group of kindergarten through high school teachers chose to focus learning, instruction, and evaluation around four aspects: questioning, making connections, representing in a variety of ways, and reflecting. These threads wove through all of their classroom activities and provided a focus for their observations and record-keeping, and for the student's self-evaluation.

In Louise Zappitello's class of seven- to nine-year-olds, the children know that questions are important: they have a "burning question" board in their room;

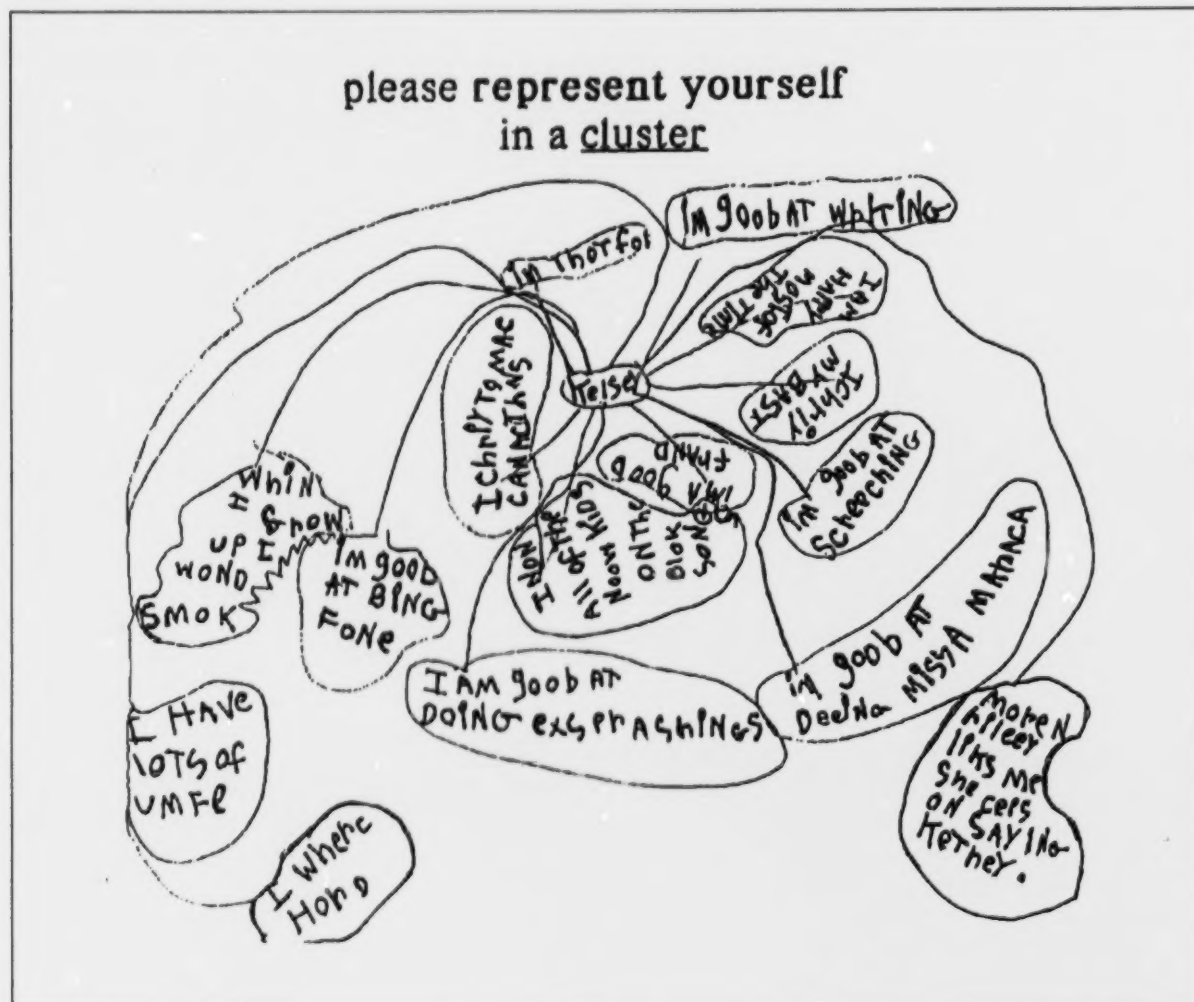


Figure 2 Kelsey's Cluster

each new area of study starts with questions which they continually revise and add to; the "audience" is expected to offer thoughtful questions to the presenters. Louise focuses her observations and comments around such questions as:

- How often does the student spontaneously ask questions?
- To what extent are the questions: appropriate for the situation? unusual or innovative? challenging or thought provoking?
- What does the student do with his or her questions?

- How does the student deal with his or her questions when they are not easily (or completely) answered?
- To what extent is the student able to extend a question or questions to sustain a project or learning activity?
- To what degree does the student evaluate his or her own questions?

Katie has been developing a list of questions during the first three days of her study of ocean life. Her questions are appropriate; many of them are innovative and challenging. She is not just idly generating questions: and one question is especially

important to her. She wants to know how long it takes for an egg to hatch, and leaves space for the teacher to provide an answer (see Figure 3).

Bill Polkinghorne's tenth grade history class also focused on questioning. After overviewing a chapter in their text, each student chose one section and generated five questions they'd like to investigate. After their questions were evaluated (and where appropriate, revised) they developed an answer to one question. Bill and the students worked together to develop the following criteria for thoughtful questions:

Powerful

- asks for an interpretation by reader
- makes connections to other events, people, causes, or purposes
- answers "why" and "how"
- gives purpose
- is open-ended

Satisfactory

- links cause and effect
- asks for chronology (events in order of time)
- is closed (finite or complete within itself)
- answers "how"

Developing

- answers "who," "what," or "where"
- asks for a brief, specific, text-explicit answer
- makes no connections

STUDENTS AND TEACHERS WORKING TOGETHER

Students and teachers at Dunsmuir, Spencer, and Claremont Junior Secondary schools on Vancouver Island are exploring strategies for creating meaningful conversations about their learning. Teachers model and support oral reflections around such questions as:

- What do you like other people to notice about your work?
- What parts of your work are especially satisfying to you?

- What did you struggle with today? How did that turn out?
- Who helped you with your thinking and learning today? How? Is there anything else someone could have done to help you? What? Who did you help? How?
- How can I be fair when I mark your work? What should I keep in mind?

Students also develop written reflections in learning logs, dialogue journals, end-of-term summaries, and notes that accompany their assignments. Students in Kathy Coleman's eighth grade French and English classes initiate evaluation conversations by letting her know what they value and would like her to notice about their work:

Three things I want you to notice about this work: I had a fairly positive attitude; I asked lots of questions; it was punctually correct.

(Jenni)

By doing this piece of work I learned some "er" verbs and sentence parts. I want you to notice that I put a lot of effort into this.

(Julie)

I want you to notice that this is the first time I have ever sat down and written a paragraph in French and that I tried my best. I'm proud that the only mistakes I made were that I didn't write the date in French and I left the "e" off of "une."

(Tracy)

Something that I want you notice about my paragraph about the sixties is that this may not look like much but I worked hard to get the information. My printing is quite small and I can fit a lot of words on one line so it looks like I haven't done much. If I had to do this again I would like to try to do it a little bit neater.

(Tracey)

It is clearly a major source of worry to many students that their effort will go unrecognized—that their teachers will think they "didn't try" or that their work "might not look like much." Those worries evaporate when evaluation is collaborative and purposeful. There is no longer any mystery about

I WONDER

wiy do fish live in
 the sea and dont
 liv on the earth?
 how do fish cumunacat?
 how can fish breth in the
 wotr and we ned tancs?
 I wonder way we cant live
 in the wotr? Can crabs
 eat fish? Can shrimp
 eat litul rock? Can big
 fish eat 20 litul fish?
 how long can wotr crabs
 live??? How long is
 Can fish sta in the
 wotr and cum up??
 wiy do we hole no tins
 and fish do?? Mrs Z
 how long dug it
 tac for a aggitach

overanses

how meny fish liv in t
 wotr? wiy or ther so
 meny crabs? wen will
 the hol unuprs of o
 Seascreehrs
 stop living?

Figure 3 Katie's Questions

how the process works and rather than inhibiting students' learning (by causing unnecessary anxiety), evaluation enhances learning.

Julie Davis' ninth grade English students offered her some thoughtful advice about evaluation in responding to her question, "How can I be fair when I evaluate your work?" Her question let them know that she expected them to be partners in the evaluation process; their answers showed their willingness to collaborate with her.

You can be fair by putting yourself into our places. Such as if one has a talent for writing and for drawing then you mark the drawing from how much effort was put into it. If it's the other way around you mark the same way. I would mark the projects by the following: completion, effort, and imagination.

(John)

I think it's hard to be fair for opinion answers since it is your own opinion. Maybe when marking opinion questions you could be marked on the depth of your ideas rather than the ideas themselves. In normal questions I think that it is simple to be fair because most questions are either right or wrong.

(Michelle)

Doug Smith's music students assess their own performance in terms of concerts, practice, contributions to class, goals, and areas they need help with. They also indicate the letter grades they feel they deserve. Joslin wrote:

I think that I have improved a lot since last term and I think the whole choir has as well. The concerts were excellent and fun, although I think we should all work a little harder to learn our words for "Phantom of the Opera..." I give my voice and musical experience to the class. I enjoy singing and music very much. I would like to improve my breath control and improve the break between the middle register and my head-voice.

The students' clear understanding of the expectations for their class is striking. So is their honesty and trust. As Selina shows below, they are engaged in a meaningful and real conversation with their teacher:

I think the class really improved this term even though we were really sick of "Song of the Sea" and "All I Ask of You." I have improved my sight reading a little. I could have learned more words of "All I Ask of You." My behavior was fine at the concert (and in class) although others were talking. I think that the songs you pick are getting better (more upbeat)...

These students know that they are engaged in a collaborative effort; and they know that their teacher is interested.

In Fred Birkenhead's eighth grade woodworking class, evaluation is shared; students are expected to keep track of their accomplishments and summarize their learning processes. For example, Colin wrote:

In woodwork 8 second term, at the beginning I made a cube with sanded edges that I painted so it only went together one way and nobody could figure it out.

Next I learned to use the plane, did notes on the plane and did all my homework on the plane. I also took a rough piece of wood, planed it, and made a perfect 90-degree angle. I learned every part of the plane and how to put it together. I also helped a lot of people with the plane.

I learned how to sand things with sandpaper and block, I learned all about the edge grain, the face grain, the grain direction, which way to sand, different types of sandpaper, etc.

I learned how to use the band saw and did both sheets on the band saw. I even worked on the band saw.

In extra time I made salt and pepper shakers and a mail opener. I also learned how to use the power drill.

Colin's summary is probably more comprehensive than any his teacher could have written; it is also personal. It highlights the accomplishments that are most meaningful to him:—his inventiveness and skill in creating a puzzle; his skill with the plane saw; and the fact that he "even" worked on the band

ASSESSING SIGNIFICANT OUTCOMES

saw. His teacher read and concurred with Colin's assessment. For most students, the written summaries stimulated brief oral or written exchanges with the teacher. In a few cases, they prompted extensive individual conferences.

Students in Bill Cook's seventh grade class frequently make decisions about the books they read and the ways they will represent their understanding. After reading his novel, Darren engages in written conversations with his teacher about his plans and the reasons for his choices. He also alerts him about what he wants noticed. Bill replies, in turn, sometimes simply with a check mark, other times with a question or comment (see Figure 4). Student and teacher share responsibility not only for the learning that is developing, but also for the demonstration of that learning that makes evaluation possible.

Elementary teachers are exploring a variety of ways of stimulating evaluation conversations with the children they teach. Often, these conversations are shaped around a few key questions. For example, in Mrs. Juliano's fourth grade classroom, students are accustomed to responding to three questions after each assignment. After completing a sequencing activity, where he was asked to arrange sentences in a logical order, Kamal offered the following responses:

What were you trying to do?

I tried to put sentences in order.

How do you feel about it?

I think I hate this activity because I hate gluing and cutting. But if I have to do a pattern with coloring I will like it!

How can I help you?

Mrs. Juliano, please try to make the stories that you pick shorter.

In primary classrooms, most of the evaluation or self-assessment conversations are oral. Many of these conversations are informal and spontaneous—a child shares or comments on an activity, and the teacher responds with a question that prompts further reflection. Other conversations are planned. In Mary-Eileen Johnson's class of five-

to eight-year-olds, the children not only enjoy talking about their work, they expect to offer their reflections and suggestions in response to familiar and repeated questions. For example, after offering their representations of a book they had read, the children's reflections were videotaped. One group dressed up like the characters in the book and role-played a television news interview. After their performance, they responded to Mary-Eileen's questions:

What would you try to remember for next time if you were going to do this project again?

To remember what to do. We forgot a bunch of things that we planned.

What do you think you learned from this activity?

Audiences really like interviews. And costumes made it more fun for us and more interesting for the audience—they made it more like the real characters in the book.

What suggestions would you give other people who wanted to do an interview presentation?

Speak up. Wear costumes. Remind each other about the parts they forget.

Four-year-old Brody has no difficulty reflecting on his work and sharing his concerns. After illustrating a train, he explains, "The train should be on the tracks. I couldn't figure out how to do it. So I kind of put it beside the tracks. But that's not how it really is. Trains are supposed to go right on the tracks. Could you show me how?" (see Figure 5).

KEEPING TRACK OF CHANGES

The teachers at David Cameron School, like many others in British Columbia, are choosing to document student growth by collecting and organizing samples of accomplishments. These portfolios or collections offer a rich resource for teacher evaluation, self-evaluation, and for prompting informed communication about a student's development. Because they provide something concrete to reflect on and talk about, the collections facilitate communication among students, parents, and teachers (see Figure 6).

I have chosen to represent my understanding of the aforementioned novel by producing the following products.

1. Pictorial Journey because it shows

all the real big events as the story goes along.	Comments: → why?
--	---------------------

2. Character Sketch because it shows

all about the main character in the book like his age, where he lives..	Comments: How will this help me understand his quest?
---	--

3. Newspaper because it shows

The main events in the story.	Comments:
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What I want you to notice. How hard I am going to try on the projects.	Comments: → I will notice I'm sure.
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"The Hostage"

Figure 4 Darren's Novel Evaluation

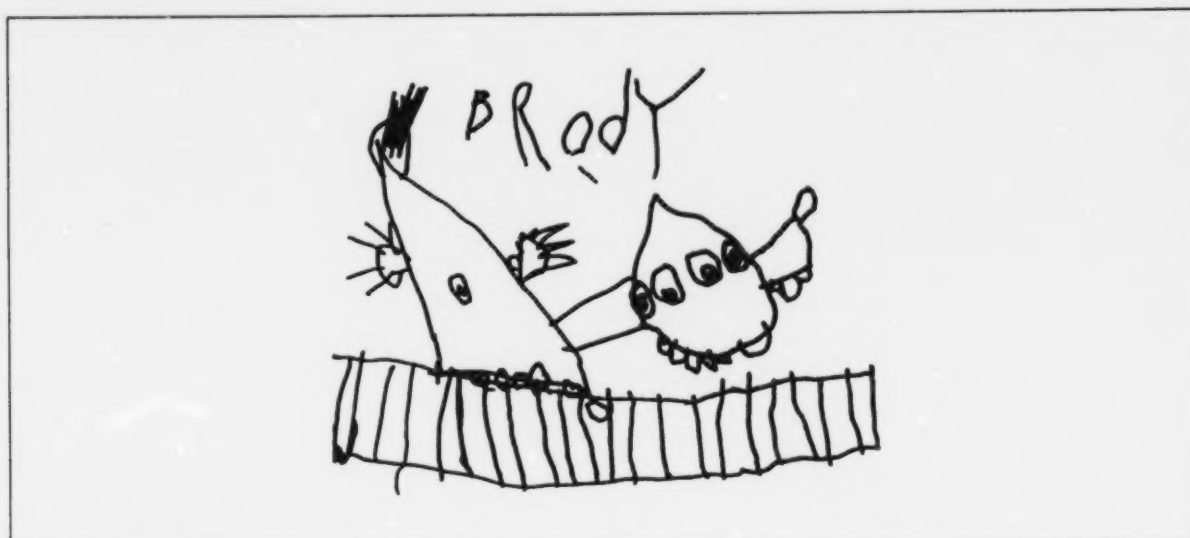


Figure 5 Brody's Train

Portfolios also help to emphasize that subjective or qualitative evaluation can and should be just as systematic as any objective measurement. For example, many teachers document students' literacy

development by collecting a response to an open-ended response task (e.g., "Read the poem. Use your ideas, feelings, and images to show your understanding") at regular intervals through the year.

WE ARE PROUD OF OUR LEARNING

As we know, our schools are changing. The focus of the new Intermediate Program is on helping students become active participants in all aspects of their learning experiences and building a sensitivity toward lifelong learning. The aims of reporting to students and parents are to:

- (1) recognize successes and give guidance for continued success.
- (2) build self-confidence.
- (3) continue the process of making learning worthwhile and enjoyable.

This folder contains materials selected by both your child and his or her teacher which will give you a sense of projects and assignments completed and progress made. One of the major purposes of this endeavor is to allow students to choose and evaluate those things they consider to be important representations of what they have learned and what they value from their learning.

Students have been encouraged to consider the following criteria when choosing material for their folder: care and effort, presentation, clarity, originality/creativity/artistic skill, improvement, and scores which indicate success.

We hope that you will take the time to respond to this small collection by commenting on those aspects you feel are well done. A response sheet has been provided for this purpose. We urge you to focus on the positive.

Guiding your child on to continued growth and success at school by helping to set reasonable goals is a valuable process. Your child's teacher would welcome a note or call at the school if he or she can help in making this report more worthwhile for you and your child.

As this collection constitutes an interim report, please sign the parent response sheet and return the entire collection to the school. Thank you.

The Intermediate Teachers

Figure 6 Letter to Parents About Student Portfolios

Others videotape "think-aloud" problem-solving sessions each term and make the tapes available for student and parent (as well as teacher) review. In some schools, children are developing scrapbook collections that continue over several years of school: each month, the children pick one or two pieces of work to put in their scrapbooks. At the end of the year, the scrapbook goes on to the next teacher as part of the students' permanent record.

Students' self-evaluation plays an important role in developing effective collections. In David Layzell's class, students focus on pride and improvement as criteria for selecting work for their collection. Kelly included a math worksheet:

I selected this piece of work because I am really proud of the multiplication that I learned so quickly so it improved my marks.

I would like you to notice that I'm not that good at problem solving but I got 6 out of 8.

This piece of work was chosen because I wanted to show you how much I have improved at all of my multiplication tables very quickly.

She comments on her improvement in other areas:

Novel study: This piece of work was chosen because I wanted to show you how much I have improved at my handwriting and how all my work is in order and underlined.

Social studies: I wanted to show you how much I have improved at being exact with the way I drew this map.

In the same classroom, Catherine comments:

Math: This piece of work was chosen because I wanted to show you how much I have improved at working with decimals and my times table.

Geography: . . . how much I have improved at what I know of Japan. I feel great that I know so much.

Catherine, like all students in David Layzell's classroom, completes a goal-setting activity at the end of each term (see Figure 7).

Children in Louise Zappitello's primary classroom also keep collections that they share with

their parents. Each piece of work is accompanied by comments from Louise and the student. In the sample in Figure 8, Ryan notices a big difference ("bivrets") in his clusters. Saulo, Greg, and Sonia commented on other assignments (see Figure 9).

Each term the children take their portfolios home as part of their reporting. Louise includes a letter to their parents that offers some insights about change. Her letter reads in part:

A unique feature of this portfolio is that it contains your child's reflections on his/her own learning and work as well as my comments. When students respond, their initial comments may be simple and lacking in detail. For example, "I chose this piece of work because it is nice." You will see a progression from this type of comment to more detailed ones as time progresses.

Another unique feature of this portfolio is our "Portfolio Review" wherein we want to involve you in responding to your child's growth and progress. Several times this year your child's portfolio will be sent home. You will notice a blank pink form on the inside front cover. We would appreciate it if you would please review this folder with your child and respond to the Portfolio Review Sheet. As you look through the portfolio pages please look for "two stars and a wish." A star is a compliment. You might compliment your child on the detail contained in a piece of writing, the imaginative drawings, some unique thinking or humor, an effective way of presenting something, etc.... After listening to your compliments, your child will be ready to listen to your wish. Wishes indicate an area for improvement. Only one wish is required as too many wishes may do more harm than good.

Parents were delighted with this form of reporting and participated enthusiastically (see Figure 10). As Louise describes:

Three things happened that I didn't expect. First, I got the reviews back before parents came for their interviews—that really helped me to prepare because I knew about their concerns in advance. The reviews helped the children to see what was valued at home as well as at school and that helped to motivate them. Finally—and almost best of all—the parents

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STUDENT GOAL SETTING - GENERAL

The most important thing I am trying to accomplish right now is to get better in Math for Area!

To do this I will need to study harder & get more help & do my homework as soon as I get home!

This is important to me because I want to be really good at it so to me it's a piece of cake!

*Sure! You can do that,
Cathi. Keep your chin up
when you start getting
confused. Ask
questions &
get help*

PARENT RESPONSE SHEET

The things I noticed about your collection were:

That Catherine has worked very hard
and takes great pride in her achievements
She finds some things a little difficult
but she seems to have the determination
to succeed with it!

The most important thing I would like to say to you now is: Keep
working hard and your achievements will continue
to grow and give you great satisfaction.

Parent's Signature : B. A. [Signature]

Figure 7 Student Goal Setting and Parent Response



Figure 8 Ryan's Clusters and Evaluation

it is exelent
and hard warkn
and it had
vantactich coloring

What I tried to do was
to finish this but I
cauldn't. And when I work
on these works again
please give us more
time !!

I feel about it
is that it was
like I was
goona be a
Othr!

Figure 9 Saulo, Greg, and Sonia's Comments

PORTFOLIO REVIEW

Date of Review: Dec 1st

Name of Reviewer: _____

Two "STARS":

 I really like the creative ideas
you have in your stories. They are
very interesting to read.

 I Am really pleased with
the way your writing has
improved over the year. The
printing and spelling are getting
better all the time.

One "WISH":

 We wish that you continue to
work just as hard as this on your
spelling and sentence structure. We
wish that you continue to enjoy school
and learning as much as you do now

Figure 10 Parent Portfolio Review Sheet

learned so much about the evaluation processes we are using, how and why they can be effective in helping children learn and grow, and also how much work it really takes. Several commented, "Sure appreciate the efforts you go to for our kids, Mrs. Z." Both the children and I felt great after this reporting period.

These are real achievements and real conversations, centered around shared values. The students, teachers, and parents I have described are finding out what they need to know.

REFERENCES

- Brown, R. (1987). Who is accountable for 'thoughtfulness?' *Phi Delta Kappan*, 69(1), 49-52.
- Brown, R. (1991). *Schools of thought*. San Francisco: Jossey-Bass.
- Brownlie, F., Close, S., & Wingren, L. (1990). *Tomorrow's classroom today: Strategies for creating active readers, writers, and thinkers*. Portsmouth, NH: Heinemann and Markham, Ontario: Pembroke.
- Brownlie, F., Close, S., & Wingren, L. (1988). *Reaching for higher thought: Reading, writing, thinking strategies*. Edmonton, AL: Arnold Publishing Ltd.
- Cameron, C., & Gregory, K. (Eds.). (1991). *The having of wonderful ideas*. Sooke, BC: Sooke School District #62.
- Chittenden, E., & Courtney, R. (1989). Assessment of young children's reading: Documentation as an alternative to testing. In D. Strickland & L. M. Morrow (Eds.), *Emerging literacy*. Newark, DE: International Reading Association.
- Jeroski, S., Brownlie, F., & Kaser, L. (1990a). *Reading and responding: Evaluation resources for your classroom*. (Primary; Vols. 1-2). Toronto, ON: Nelson Canada. (Available in the U.S. from The Wright Group, Bothel, WA).
- Jeroski, S., Brownlie, F., & Kaser, L. (1990b). *Reading and responding: Evaluation resources for your classroom*. (Vols. 1-3). Toronto, ON: Nelson Canada. (Available in the U.S. from The Wright Group, Bothel, WA.)
- Ministry of Education. (1991). *Thinking in the classroom: Resources for teachers*. Victoria, BC: Author.
- Perrone, V. (1991). *Expanding student assessment*. Alexandria, VA: Association for Supervision and Curriculum Development.

HOW TO GRADE (IF YOU MUST)

James Bellanca

The flush rose on Alan's face. His hands quivered. "It's not fair," he shouted. "I worked hard. I didn't deserve a B+. This will wreck all my chances for Harvard."

Mr. Beaster stood silent. As Alan took a breath, Beaster interjected; "Alan," he began, "your grade...."

Alan glared. "It's not my grade. I worked for an A. I deserve an A. I need it. This is the last semester. The good colleges will look at my grades. If you don't give me an A, my class rank drops."

Again Beaster tried to interrupt, but Alan kept on, nostrils flaring, his face now beet-red. "You're cheating me," he screeched. "You're ruining my life. My father will kill me. There's no way this grade is O.K. If you liked me, you would give me an A. You're not fair."

"Alan," countered Beaster, "I'm not going to debate this grade with you. If you want to discuss it when you are calm, I'll be glad to."

"Bull _____. You'll never change it," Alan pouted as he turned to leave. "You teachers are all alike. You _____."

What teacher has not faced an angry Alan or his parents, unhappy with a grade? From first grade on—now even in preschool—grades become a consuming passion for high-achieving, earnest students. If Alan doesn't get the best grades, he does not see himself as the best. Without being the best, how will he get in the top track or the best college?

Alan learned from his first years in school that grades count. Teachers praise students with the best grades; they scold or ignore those with low grades. Teachers assign front-row seats to students with high grades; those with low grades are banished to the back. Parents give rewards for high grades and frown and lecture about low grades and being a failure.

By the seventh grade, Alan knew the game well. Study hard. Do all the homework. Memorize all the vocabulary. Raise your hand first. A is the target. Get the most A's. They count for high school. They guarantee the fast track. The fast track is a ticket to fame, fortune, and happiness.

Alan was prepared for high school. He charted his grade point average each semester. While taking the college prep curriculum, he learned how to bail out of classes with "tough" teachers. He discovered which electives would pad his GPA. By the end of his junior year, Alan could memorize a page of course notes in a half-hour, disguise Cliffs Notes in well-formatted and grammatically perfect essays, and copy lab notes with total precision.

* * *

Carmela stared at the floor. Mrs. Martinez sat beside her. Carmela did not move. "Carmela, what am I going to do with you?" Mrs. Martinez asked. "Your grades are getting worse. You are a bright girl. You should be doing better. You are not a D student."

Carmela still did not move. "I do care," she thought, "but it's not so easy. It never has been easy. I've got more to think about than school. School doesn't help me make the dinner or watch my brothers and sisters at night—especially when there is no dinner. And even if I do study, I'm always getting a C or a D. So why bother? I can do C or D without studying."

"Carmela," pleaded Mrs. Martinez, "Don't you know you are wasting your life? Look at me, Carmela. What do you have to say?"

Carmela shook her head. "It doesn't matter."

What teacher has not counseled a Carmela? Her mother works long hours. Carmela, the oldest of six children, is responsible for their care before and after school. She dresses them and hurries them out the door in time for school. After school, she walks them home. Even in winter, they walk together. "You will be safe from the gangs, if you do," her mother admonishes. "You keep them together." Once home, she locks the door and starts dinner. By the time her mother arrives, the young ones are ready for bed. Only then, dog-tired, does she open her history text.

Carmela learned in first grade how grades counted. After school, Carmela's mother helped her do homework. Together, they practiced her English, read the story sheets, and marked the answers. When the teacher gave Carmela a smile sticker or a star, Carmela was pleased. Her parents praised her good grades. But in the fifth grade, when her father died, things changed. Carmela's mother went to work. She left each morning at 7:00 and arrived home after 9:00 at night. With her two jobs and Carmela's help with the children, Mrs. Ruiz managed. But there was little time or energy for Carmela's schoolwork or the other children. "Just graduate," she would admonish Carmela.

Carmela wanted to tell her teacher what was wrong. But what could Carmela say? It was best to stay quiet. She knew grades were important, especially if she wanted to please her teacher. But her family was more important. No matter how Carmela tried to study, someone interrupted: Miguel was hungry or Tomas wanted help with his schoolwork.

What could she do?

Grades, especially those based on the competitive curve, create fearsome anxieties for students like Alan and Carmela as well as for their teachers. In our highly individualistic society, the grading curve exacerbates the most negative anti-learning attributes of competition. Because the grading curve brands winners and losers, it works against the goal of successful learning for all students. First there are the Alans who have been programmed from birth to earn the right grades in order to enter the right schools. Next, there are the Carmelas torn between an array of real-life priorities and pressed by forces over which they feel they have little control. These are joined by those who learn slowly, but well; those who are bright but not yet language proficient; those with small motor deficiencies that prevent fast writing; those who fear beatings for low marks; and those whose whole lives are measured by good grades.

For every student who "wins" with an A, there is one who "loses" with a B, C, or F. For the ten percent with the top GPAs year in and year out, there is at least an equal number who sit at the bottom. As

the top scorers become more enamored of their successes in school, one by one, the bottom dwellers give up and go elsewhere. Top scorers are motivated by their great grades to do better; poor grades in a competitive system only encourage the bottom scorers to languish or leave.

THE AIKIDO PRINCIPLE

For every teacher who confronts the practical and moral issues of school grading practices, the pressures to use a mere letter or number to sum up a student's performance over a day, week, or semester never subside. Some handle the stress by ignoring all assessment. Others burden themselves with elaborate accounting procedures, searching in a plethora of numbers for some way to quantify what a student learns. All too many succumb to the pressure to teach only what is measurable, in spite of the knowledge that very little that truly challenges students in their learning is, as yet, measurable by conventional grading practices.

The cooperative and thoughtful classroom requires a teacher with the skill and the will to teach

with a **triple classroom agenda**: the curricular content; the cooperative attitudes and skills; and the thoughtful dispositions, processes, and skills which mark mindful students. In this classroom, the teacher must structure lessons so that students not only learn facts, concepts, and subject skills, but also incorporate cooperative learning as a base to develop each student's capabilities as a critical and creative thinker in search of thoughtful results. As classroom teachers who are skilled in the delivery of triple agenda lessons can testify, this is no easy path. They can also argue that the biggest thorns in their side are the lingering demands from administrators, parents, and students that they use the archaic grading system and that they limit instruction to what is gradable. It seems no matter how creative the teaching and learning, traditional perceptions of good schooling are still reflected in the same old "wad-ja-get?" mentality (Kirschenbaum et al., 1971).

Given the pressure to maintain the traditional report card with its standard way of answering the wad-ja-get question, the question most often asked by teachers attempting to implement the triple agenda classroom is: "What do I do? I may be challenging students to think, to cooperate, and to work on authentic tasks, but my district says that I must summarize it all with a grade on the report card."

To answer this question, I have found it most useful to start with the Aikido principle. In the martial art of Aikido the essential rule is to use the defense as the offense. Rather than attack the opponent, skilled Aikido practitioners learn to step aside from their opponent's thrusts. As the assault passes, the Aikido practitioner seizes the passing energy and uses that force to "assist" the attacker to defeat him- or herself. When using this principle, the triple agenda teacher avoids taking attacks that attempt to force simplistic grading practices on complex learning tasks. Instead, the teacher lets the opponent expend the force of the attack and turns the energy of the attack back into itself. Because triple agenda teachers know that instruction and assessment are twin inhibitors of substantive learning, they side-step the arguments that seek to preserve the grade at all costs. They know it is a fu-

tile task to convince parents and students—especially those overachievers who have learned well the value of grades for upward mobility—that grades are contrary to cooperation, destructive to learning, and counterproductive to skillful thinking by all students. The wad-ja-get mentality is ingrained too deeply. Rather than do combat with the argument, the teacher knows it is more helpful to step to one side and concede to the demand for grades and develop an assessment format that connects feedback to performance without a curve. He or she can, if necessary, reduce the more valid and authentic assessment information to a simple letter grade. Although this is not the ideal solution, it is an important trade-off. By giving in on the grading curve issue, triple agenda teachers are free to focus students' full energy on complex learning and cognition. In this context, grades satisfy the short visions of those who value letters and numbers at the end of a school year more than the learning that takes place day in and day out. Grades are not allowed to jeopardize the essence of the thoughtful classroom.

THE TRIPLE AGENDA CLASSROOM: PART ONE

In the triple agenda classroom, the teacher has multiple means to motivate students' thinking, cooperation, and mastery of content without relying on grades.

Expectations will determine how high a level of thinking and cooperation will come from every student in every lesson. The lowest expectations come from those who signal students that the only important learning is that which is rooted in recall or regurgitation of textbook facts. If a teacher limits standards and teaching expectations to low-level outcomes—the single agenda—that is what students will provide. Such performances are easy to grade. If, however, the demands of serious cooperation and high-level thinking outcomes are added to each lesson, the expectations will result in students who use their cooperative skills and their thinking strategies to produce triple agenda results. Any visitor to such a classroom will see heads together, engaged in high-level thinking tasks. In

this context, triple agenda assessment is less a worry and more a window of opportunity that challenges students to behave intellectually in ways they would not believe possible in a recall-oriented classroom.

For example, while students are doing their learning tasks (e.g., vocabulary study, math problem applications, or biology lab experiments), the teacher moves among the small groups. In addition to answering content questions, he or she observes instances of students using cooperative social skills and keeps a check sheet on a focus skill such as encouragement. When the task is finished and students have reviewed their own cooperation, the teacher uses the check sheet to give feedback on their progress with the key social skills.

After the first few practices, the teacher adds an observer as a role in each group. She gives the observers check sheets. Each observer has the task of recording observed cooperative skills used in his or her group and of giving feedback during the group processing time.

As the week progresses, the teacher can initiate a group or class chart that graphs the improvements. Once the graphing begins, he or she can establish performance standards with clear benchmarks. Each group takes charge of its own practice and the assessment of its progress.

If grades are required, the teacher can assign a letter grade for each numerical benchmark (observed instances of the expected social skill). At the end of one marking period, each member of a group will receive the grade of the benchmark attained by that group. That grade is averaged into the individual's group grade.

Benchmarks	Grades
30	A
25	B
20	C
15	D

Individual Assessment

In addition to assessing students in groups, the teacher may elect an individual assessment of each student's use of the focus social skill in various

groups. Issues for the teacher to assess include: How regular and natural is the student's use of the skill in task groups, informal groups, or large class activities? What improvements are observable? A page of Likert scales will make the task easy.

What I did well:

- listened
- did my job as checker
- did not interrupt
- looked at the speaker
- spoke quietly

Not Yet Sometimes Daily

The reverse side of the assessment sheet identifies the words and behaviors associated with the cooperative social skill and matches a chart hung in the classroom. Each student fills out a scale with appropriate comments before the teacher adds to it. The students may take the weekly charts or a quarterly summary home to parents or they may insert the charts in their portfolios. Another option is to have students write a commentary in their journals about improvements they are making on applying the social skills. Younger children may use a check sheet.

If the teacher must provide a grade for the social skill, there are several options.

- Use the all-class norm as the C grade. For instance, the all-class norm for use of the designated behavior is five per week. A grade scale would look like this:

A = 9+ B = 7
C = 5 D = 3

- Base the grade on individual improvement:

D = increased average daily use by 1
C = increased average daily use by 3
B = increased average daily use by 5
A = increased average daily use by 7

- After the class has had sufficient practice, set standards for observations. After posting the

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standards, inform the students how each may earn a grade for social skill use during this test week.

C = 6 instances observed

B = 9 instances observed

A = 12 instances observed

- Use an individual observation sheet. Each day during the week focus on one-fifth of the class and record the instances noted.

During the term, repeat the test week at least three times. After the first test week, it will be necessary to put the students on notice. The teacher announces that there will be at least two unannounced test observations in the month.

If the social skill is not a separately listed grade, but only a part of a total grade, the teacher can decide on the percentage the social skill grades will count. He or she may adapt the chart and send it to parents, explaining how he or she arrived at the social skill grade and describing its weight in the grading scheme.

THE TRIPLE AGENDA CLASSROOM: PART TWO

Can a teacher assess thinking? Many say no. They argue that thinking is individual, internal, an ability fixed by birth, and something a student either has or doesn't. Others argue that grades inhibit creative thinking by imposing too much prior judgment. Because of these factors, the naysayers argue that it is neither fair nor possible to assess thinking. Given certain conditions, however, a teacher can and must assess improvement in a student's thinking patterns. Although not recommended, a teacher can even assign a grade to such improvement.

It is true that what happens in the mind is not something a teacher can easily assess. What happens outside the mind is something a teacher can assess: words, spoken and written, artifacts in many forms, and thoughtful behaviors reflect much about each student's thoughts, dispositions, and conceptual processes. The skillful teacher, under-

standing that thinking is an alterable process, knows that it is possible to teach and improve both the quantity and quality of a student's thinking skills, thinking processes, and thinking dispositions. To help the student understand the degree of this improvement, the teacher will use all available tools to assess observed behaviors. When required, he or she can reduce what is most important in a student's thoughtful progress to a grade.

The most basic assessment of thinking begins with the teaching of thinking skills. In an instructional framework, the teacher will select two to four specific thinking skills already implicit in the chosen curriculum. For instance, in the primary grades, attributing, sorting, and sequencing are often-used skills. In the late primary grades, inferring, predicting, and classifying are buried in the reading and math curricula. In high school geometry, estimating is a core thinking skill.

There is little need for introducing a plethora of thinking skills. It is more beneficial to students' conceptual development for the teacher to identify a few skills implicit in the curriculum and to make them explicit. There are several advantages to this model:

- It avoids overloading the curricula.
- The skillful teacher can use thinking skills as an integrating thread. The thinking skills can link various topics, units, and courses that otherwise might appear fragmented and separate to students.
- It allows the skillful teacher to design a thinking focus that will encourage student transfer across the curriculum.
- The teacher can introduce each thinking skill at the level of concreteness and simplicity appropriate to the students' cognitive development. For example, in kindergarten, students learn to sort objects by color, size, and shape; in the middle grades, the students build on this expertise by learning to classify animals, cultures, or historic periods; in high school, they extend their classifying skills in biology, literature, social studies, or practical arts with more abstract or more complex data.

- It encourages students to learn thinking strategies that apply to many types of material.
- The teacher has opportunities to assess thinking skill use and development with easy-to-use tools.
- It encourages students to become more reflective about their own thinking and more responsible for self-assessment.
- It builds a foundation for more sophisticated assessment of student dispositions toward thoughtful learning.
- It makes it possible, if required, to grade students' understanding of thoughtful behavior and their use of these behaviors in different situations.

What follows are suggestions for authentic assessment—and grading if required—of significant and thoughtful classroom tasks.

Primary School Assessment: Sorting

Evaluation Tools Make a sorting mastery matrix for each child. Keep all the sheets in a loose-leaf binder until you are ready to place them in each student's "For Home" portfolio. When the child demonstrates the item, enter the date (see Figure A1) or a check (see Figure A2).

Share the assessment matrix at the parent conference. In this case, you can personalize discussion of the student's progress and where the student stands in relation to your expectations.

Grading If your school expects a report card grade, the criterion checklist (below) is an easy option.

1. **Equivalent Points.** If you want a specific grade, each time the student demonstrates an item on the matrix or check sheet, award a point. Set criteria for letter grades by quarters of the year.

Quarter	C	B	A
1	3	4	5
2	6	8	10
3	9	12	15
4	12	16	20

2. If sorting is only part of your class grade, establish the percentage of the total grade for which the sorting grade will count. For example, if sorting is ten percent of the total final grade, calculate the number of points earned by the student in the sorting work and add that number into the student's total (see Figure A3).

Middle/High School Assessment: Classification Evaluation Tools There are multiple ways to assess individual work at this level.

1. Check for understanding using a knowledge quiz or test of the thinking skill (see Figure A4).

2. Check for performance using a new application (see Figure A5).

Decide what percentage of correct answers from above equate with what letter grade. If you used all items from the above knowledge questions, your scale might look like this:

Letter Grade	Point Scale
A	93
B	85
C	78
D	70

Using the fluency criterion (the number of correct answers generated on an open-ended question), set a grade standard.

Correct Answers	Grade
13	A
10	B
7	C
5	D

3. Provide ongoing feedback to group products.

- On each of the group Venns, praise those that either increase fluency from the previous Venn or that surpass the top standard. Encourage those that remain at the same fluency level from task to task. ("Good start. Let's see one or two more items on the next Venn.")
- Chart individual improvements on the fluency criterion.

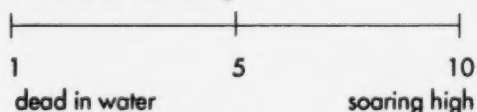
ASSESSING SIGNIFICANT OUTCOMES

4. Invite students to assess their thinking improvements:

Card Talk Give each student a 3 x 5 index card once a week. After each has named and dated the card, provide a self-assessment stem. ("I know I am getting better at classifying because..."; "I'd rate my improvement at classifying as _____ because ...") Collect the cards, select a few to read aloud (keeping names anonymous) and a few to review each week to write a return message to the students. The message should provide a positive comment about the student's completed stem. Explain this to the class. File the others in the students' portfolios.

Journal Entry Several times a week, conclude the thinking work by inviting students to comment about their thinking in a journal. Let students know you will select five or six journals to review each week. Provide cues to help them focus their thinking for this skill:

Rate your knowledge and use of classifying. Give your reasons for this rating.



Rate how much you think you are improving with your use of the Venn. Give your reasons for this rate.

Think about how you could improve on your use of the Venn. Explain.

5. Use charts and graphs to show progress by groups and/or individuals.

Class Thermometer On a bulletin board or blank wall, post a thermometer on newsprint. Mark the graduations. After each practice, tally total points earned in each classifying practice. Give bonus points for each group that improved its score from the previous practice round.

Group Bar Graph Post a bar graph on the bulletin board. After each practice, have the recorder add to the graph with accumulated points and improvement bonus points.

Individual Improvement Chart Insert a chart in the back of each student's journal. After each round of group practice, give students an individual task for making a Venn. Have the groups check each other's finished project and chart the score including an improvement bonus on the chart.

Grading If you must reduce the student assessments to a grade, here are two options:

- To grade the knowledge base, scale your quizzes and tests (see Figure A6).
- To grade guided practice, indicate the student's performance on each scale. Provide five points for Regular, three for Sometimes, and zero for Not Yet. Scale the totals as above (see Figure A7).
- To grade independent practice and transfer, assign points to each mark on the Likert scale, total the points and then make the final grade scale or ask the student to select his or her best work, indicate to you the reason, and give a Likert scale rank. Review and use as the basis for a final grade.

Transfer Once students demonstrate proficiency in using the Venn with assigned reading materials that you selected for classifying, you have the opportunity to promote independent practice and transfer. If necessary, you can grade the results.

If you are teaching a self-contained classroom, structure transfer or independent practice:

- Provide materials or readings to classify. For instance, in science, assign two animals to each observer; in social studies, two cultures to compare; in language arts, two characters or two settings in a story or two poems by the same author; in fine arts, two compositions by the same artist. Instruct the students, either singly or in a cooperative group, to review the procedures for classifying by using a Venn.
- Send pairs of students on a search for materials or readings to classify with a Venn. When they find the materials, each pair will write instructions for the clarification task. Check the instructions and trade assignments among the pairs. After pairs have completed the assignments, they will give the completed Venns back to the originating pairs. These pairs will

review the work and respond with what they thought was done well.

- Instruct individual students to find materials or readings to classify in their other classes or at home. (This is where middle school interdisciplinary teams are especially helpful. All teachers on the team can reinforce the classifying thread across all areas of the curriculum.)
- Provide a list of new vocabulary words. Instruct individuals or teams to find the meanings in a dictionary, sort the words into at least two (three or four is more challenging) groups using a Venn on an overhead transparency and label each group by its common elements. If there are items in common, students should insert these in the overlaps. Complete the task by asking the students to explain to the class why they made each group. (Have them write and cut the words from a blank overhead. They can place these words on the overhead Venn transparency for all to see.) To assess this task, here are several options.

Self-assessment Instruct the students to attach a PMI (Plus/Minus/Interesting) summary to their completed work. (Edward de Bono invented this evaluation tool. It is an excellent vehicle for helping students develop their disposition to evaluate their own work.) Students should ask themselves: What were the pluses of their project? What were the minuses? What interesting questions do they have about this project? (Or what interesting questions might others ask?) Encourage three or more responses in each element.

PLUS

- lots of words
- five groups
- groups all agreed
- mostly good
- followed instructions
- all can explain

MINUS

- #2 no why
- argued about #4
- two leftovers

INTERESTING QUESTIONS

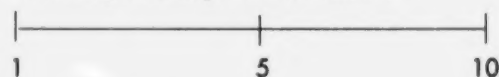
- what would happen if we grouped in a different way?
- why were the "whys" so hard?
- where can we use these words?

Group Assessment Invite the groups to use evaluative questions about the thinking they did:

- What did you do well in your classifications?
- How might you have classified the information in a different way?
- Where might you use the ability to classify?

Individual Assessment Invite individual students to rate the thinking they applied:

In a scale, tell how you did a classifier.



Explain your rating

Transfer Scale Provide students with a transfer scale. Show examples of what that transfer looks like or sounds like at each point on the scale.

NOT YET:

"I don't see how to use this."

"This is dumb stuff."

"What's the connection?"

A SMALL LEAP:

"I can compare short story characters using a Venn."

"It will help with math sets."

A WORLD-CLASS BRIDGE:

"We can compare job benefits after an interview."

"I can contrast political beliefs before voting."

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The students might share what they have written with each other or the whole class, enter it in a journal, write a parent letter, or deposit the assessment responses in their portfolios with the "thinking products" they created. To emphasize the transfer element, it is important that the teacher close the transfer activity by reviewing both the basic thinking skill and ways to use the skill in school and in life.

The grading of transfer may be the ultimate absurdity. A grading requirement, however, is not sufficient reason for leaving this crucial learning opportunity out of the curriculum. The following option, built on the above assessment, is suggested.

Grade the PMI with a fluency criterion (how many acceptable examples) or uniqueness criterion (how many "a-ha!" insights). For fluency, you might use the chart.

- less than three acceptable answers per column "not yet; add some more and I will give a grade."
- three acceptable answers per column = C
- five acceptable answers per column = B
- seven acceptable answers per column = A
- one bonus point for each additional acceptable answer per column

You can also award bonus points for each response given that shows insight and was not given by anyone else in the class.

For each evaluative question, you might use the fluency or insight criteria. Or you might use logical extension with more mature students. In this criterion, the students are asked to give reasons why they answered as they did. For each rationale or piece of evidence supplied, the student earns points. For instance, here is a grading scale for responding to the first question with logical extensions.

- one justified example or one justified reason = C
- two examples or reasons = B
- three examples or reasons = A
- additional examples or reasons = bonus points

For the transfer scale, grading becomes simple.

NOT YET: No grade earned. Keep at it.

SMALL LEAP: C

WORLD-CLASS BRIDGE: A

THE TRIPLE AGENDA CLASSROOM: PART III

When a teacher ties cooperation and thinking into learning tasks with significant content outcomes, he or she completes the triple agenda. In the "integrating the curriculum" literature, this is known as the nested model. Not only does this model make thinking and cooperating an integral part of every lesson, it also allows for the most logical and simple way to assess and grade student attainment of complex and significant outcomes.

When integrating the three elements of thinking skills, cooperation, and content into a single lesson, it is helpful to follow these guidelines:

1. **KISS: Keep it simple and structured.** The "it" is the process of assessment and evaluation.
2. **START with a significant outcome.** As Sizer (1992) suggests, these are best framed in an "exhibit" framework.

An Elementary Language Arts Sample

Your team will write a safety book for second grade children. It will include:

- pictures and words
- a cover with title
- the dangers
- the ways to avoid the dangers
- quotes from parents, safety officers, teachers, and other members of the community.

Be prepared to read and to tell the first grade class why you picked each danger.

A Middle School Science Sample

Act as your village's waste disposal research team. You have a budget of \$12 per household to dispose of the glass waste in the village. Make three plans (good, better, best) to recommend to the village council. Provide a budget that is maximally effi-

cient and will leave the village free of glass litter. You will need to consult with village officials and research village data in the library. Be prepared to defend your recommendations and your reasoning. You will submit your plans to the entire class the class will select the best plan for the village.

A Secondary Geometry Sample

By using knowledge of radius and circumference, compute the time it will require a plane pilot, a truck driver, and a bicyclist to complete each of the following circular routes. Be prepared to explain all procedures you selected and the variables attendant on your solution to the class.

- New York to New York on the class globe
- Dupont Plaza to Columbus Hotel to Library Park to Dupont Plaza
- Michigan City to Johnsonville to Bloomington to Saletto to Michigan City

Identify and share the indicators of success with the students before the lesson or unit starts. In a triple agenda lesson, the teacher and students will use the indicators for the assessments. As the class works through the lesson, some assessments will focus on progress. Others will assess terminal results or transfer. The indicators make clear and easy benchmarks or signposts that the students can follow. They also prevent students from confusing benchmarks with outcomes.

Let student self-assessment precede your feedback. This helps students learn the skills and value of self-evaluation. In this scenario, your feedback fills out or extends the students' self-evaluation. The double-entry journal (student writes on one-half the page; teacher responds on the other) is a helpful tool for this, especially when the students are focusing on progress.

Have students use a consistent tool. The Likert scale with reasons or the PMI are easy frameworks for students to adapt. Skillful and careful practice in using one tool will yield more realistic assessments.

Delay any grade until the very last. Grades are for report cards. Whether using letters, numbers, or symbols, a teacher saves grief by not entering a grade for every paper that crosses the desk. While

students who are grade hungry may pester for grades on every task, just say no! If a teacher indicates how students will receive the final grade and sticks with the plan, the students will focus on assessment quality more readily.

Use the funnel model of assessment. It begins with the three-level outcomes for the lesson or unit. Next come the indicators of success and the assessment tools, beginning with self-assessment of products, and knowledge tests that the students will use. As students progress through the unit, they will organize in a portfolio the completed work and assessments. At the end of each unit, each student may select his or her best work or three works and write a rationale for the selection.

With this final assessment submitted by the student, samples of the best work for the unit, and knowledge test results, the teacher has more than enough data to judge to what degree the student has met the three-level outcomes: Not yet, O.K., or WOW! With all work funneled through this process, attaching a meaningful grade is an easier task.

When you use *Not Yet*, you will need to reteach and encourage more effort. This approach has the advantage of signaling to students that *all* outcomes are possible and necessary to attain. Not "getting it" is *not* a terminal illness. All learning is possible. Some need more help and more time, especially with transfer.

IN SUMMARY

Triple agenda instruction provides the opportunity for triple agenda assessment. It enables the classroom teacher to make assessment authentic. Although the triple agenda model requires more upfront work to prepare what the students will learn, it enables the teacher to focus on the quality of students' collaboration and cognition. In its simplest form, the model focuses on skill acquisition and application. It makes teachers the center of classroom intellectual activity; their modeling, planning, facilitation, and assessment help the student become both a cooperative team player and able to thoughtfully apply thinking skills and processes.

In the triple agenda model, the teacher's expertise as a facilitator is crucial. She or he doesn't

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dump information into empty minds. The teacher provides students with the skills and the dispositions to learn: how to acquire, understand, and assess their own learning. This is seldom compatible with or even allowed by conventional school practice, especially when it comes to the demand for grades in a grade book.

The excellent teacher facilitates, making learning happen for every child, no matter what the child's handicaps or limits. The teacher's job is not to be an accountant. Current classroom practice—which pressures the teacher to pour information

into empty vessels, and to test for the purpose of grades and grade point averages—hampers effective teaching. However, because grading traditions are so deeply ingrained in the American school psyche, it is probably not worth the teacher's time to fight the wad-ja-get mindset. Instead, it is probably best for the teacher who values thinking to concentrate on improving triple agenda instruction and to compromise in the grading game with standard-based grades that do not interfere with the ability to help all students to think and cooperate.

FIGURES

MASTERY MATRIX					
NAME _____		START DATE _____			
THINKING SKILL _____		END DATE _____			
	Names	Carmela	Alan	Roberta	Robin
1.	Can sort by shape	9/15	9/17	9/24	9/20
2.	Can sort by color	9/20	9/20	9/25	9/21
3.	Can sort by size	10/1	10/1	10/8	10/5
4.	Can sort by thickness	10/9	10/12	10/12	10/12
5.	Can sort by symbols	10/14			
6.	Can sort by _____				

Figure A1 Mastery Matrix

CHECK SHEET			
Name:	Class:		
	Not Yet	Adequately	Very Well
SKILL			
Sorts by shape	X		
Sorts by color			X
Sorts by size		X	
Explains sorts		X	
Mixes sorts		X	
Helps others sort	X		

Figure A2 Check Sheet

ESTABLISHING PERCENTAGE OF TOTAL GRADE			
Sorting:			
Points earned:	19		
	<u>8.1</u>		
	1.9		
Other points earned:			
Works with others	2.4	➡	
Numbers	2.6		
Color identification	1.0		
Shape identification	1.2		
Letters	1.1		
Homework	1.7		
Make a Book project	.9		
Asia project	1.2		
Social Studies	<u>1.3</u>		
	16.3		
		Scale:	
		A = 20	
		B = 15	
		C = 10	
		D = 5	
			➡ Grade = B

Figure A3 Percentage of Total Grade

SAMPLE KNOWLEDGE QUIZ			
NAME:	DATE:	CLASS:	
Answer True or False.		(ANSWERS)	
1. To sort is to put items into a step-by-step order.	T	F	(F)
2. To sort means to group objects that are alike.	T	F	(T)
3. Likenesses and differences help us classify.	T	F	(T)
4. A Venn diagram is a classifying tool.	T	F	(T)
Eliminate what doesn't belong in each group.			
5. a. elephant b. tiger c. lion d. dog	_____		(d)
6. a. house b. tree c. flower d. grass	_____		(a)
Put the steps in order for classifying with a Venn.			
7. label the Venn parts	_____		(2)
8. put items in each part of Venn	_____		(3)
9. draw your Venn	_____		(1)

Figure A4 Knowledge Quiz

SAMPLE APPLICATION CHECKUPS

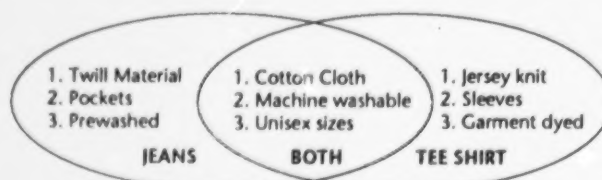
1. Read the following two paragraphs from a clothes catalog. In the Venn below, label the three parts. Enter the likenesses and differences that fit each part. (1 point per correct answer)

Twill Jeans

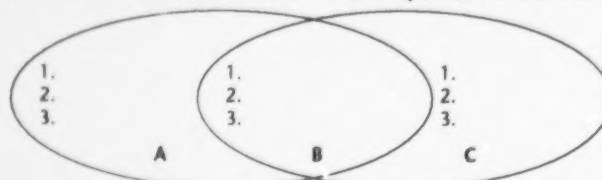
Jeans that follow in the same tradition as our blue jeans, except these are made from sturdy 10 oz. cotton twill. The color is also notable: our special piece dyeing process lends every color a wonderfully saturated quality. We then garment wash these jeans for immediate softness and comfort. Traditional fit. Riveted front pockets. USA. Machine wash. Unisex 26-34, 36, 38, 40. Order hemmed up to 36", or unhemmed.

Plain-front Jersey Tee

A substantial shirt of midweight cotton jersey. Densely knit for opacity and smooth texture. Garment dyed for depth of color. Generous fit. Domestic and imported. Machine wash. Unisex (same as men's) sizes S, M, L, XL. Short sleeve or long sleeve.



Make the Venn below. Show how sorting and classifying are alike and different. Pick two people in this room. Use the Venn below to show how they are alike and different.



In the Venn above, likenesses go in _____ and _____. (Select from A, B, C.)
Differences go in _____.

Figure A5 Thinking Skill Checkups

GRADING SCALE

Correct	Number	Letter	Comment	Symbol
28	90%+	A	Exceeds expectations	++
22	80%	B	Meets expectations	+
15	70%	C	Meets minimum	0

Figure A6 Grading Scale

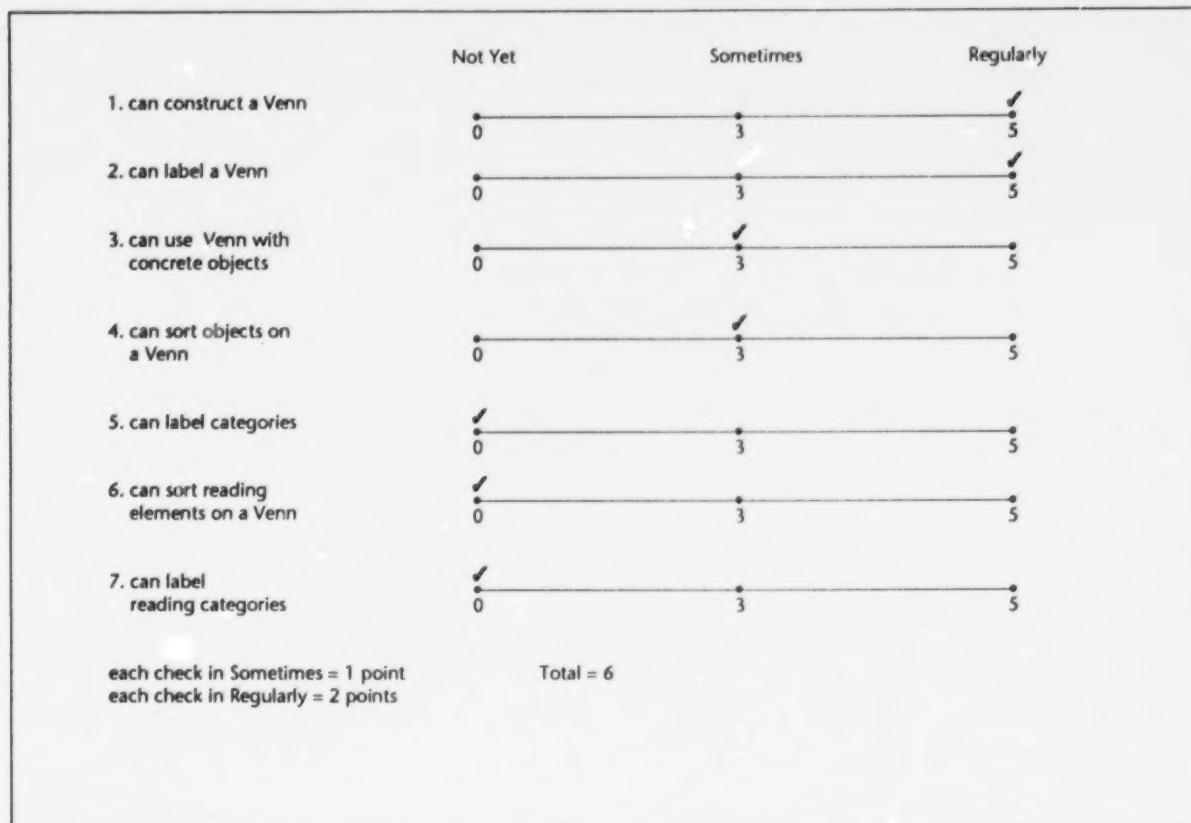


Figure A7 Grading Scale

REFERENCES

- Belmont, P., & Dickison, M. (Eds.) (1991). *Portfolios: Process and product*. Portsmouth, NH: Boynton/Cook Publishers Heinemann.
- Bellanca, J. (1991). *Building a caring, cooperative classroom*. Palatine, IL: Skylight Publishing
- Board of Education for the City of Etobicoke. (1991). *Making the grade: Evaluating student progress*. Scarborough, Ontario: Prentice-Hall Canada.
- Gerhard, C. (1991). *Assessment of conceptual organization (ACO): Improving writing, thinking, and reading skills*. Philadelphia: Research For Better Schools.
- Kirschenbaum, H., Simon, S. B., & Napier, R. W. (1971). *Wad-ja-get? The grading in American education*. New York: Hart Publishing.
- Mitchell, R. (1992). *Testing for learning: How new approaches to evaluation can improve American schools*. New York: The Free Press.
- Perrone, V. (Ed.) (1991). *Expanding student assessment*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Simon, S. B., & Bellanca, J. A. (1976). *Degrading the grading myths: A primer of alternatives to grades and marks*. Washington, D.C.: Association for Supervision and Curriculum Development.
- Sizer, T. (1992). *Horace's school*. New York: Houghton Mifflin.

EVALUATION: A COLLABORATIVE PROCESS

Bena Kallick

“**D**id I get this right?” “Is this what you had in mind?” “Is this work good enough?” So much of a student’s sense of “good” work depends on someone else telling us if we have it right. I am not talking about the kind of work for which there is a single right answer. I am talking about work that requires complex thinking, problem solving, divergent ideas, a new synthesis of one’s knowledge base, or applying knowledge through performance—the kind of answer that requires the student to be the producer of knowledge rather than the reproducer of knowledge. When we move into that zone of uncertainty in which right and wrong are a matter of a shared understanding of expectations and criteria, we need response. We need a mirror placed before our work that provides an opportunity for reflection and constructive criticism for improvement. We need to be provided with an opportunity to talk about our work with others as we develop our capacity to be sharper in our self-evaluation. The learner’s task in the evaluation process is to:

- internalize external standards and expectations for good work,
- understand explicit ways to improve performance to meet those standards,

- develop a self-determined set of standards for high-quality work, and
- learn how to engage in a dialogue about appropriate standards for good work and to negotiate standards based on justifiable evaluative reasoning.

In order for the learner to be successful in this task, classrooms must provide opportunities for collaborative evaluation processes.

OWNING THE EVALUATION DATA

A first and most important assumption is that if learners are to change their behavior as a result of newly learned knowledge or skills, they must own the evaluation data. Unless the learner sees the reason to change; believes that the change is worthwhile; and sees a way to integrate that change into already existing behaviors, attitudes, and knowledge, the change will not take place. If these criteria are not met, learners may be able to reproduce knowledge in a limited way for a limited time, but integration of the new knowledge or skill by the learner as an actor in the world will not happen. Performing as a learner is analogous to performing

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as a teacher—to get better you need to practice; receive accurate, descriptive responses to your work; receive sound advice from a coach or mentor; and develop the capacity to reflect on your practice and judge your performance in relationship to targets determined by self and others.

Improvement, in the sense of being able to perform better, is judged both by coach or mentor and by self. If either source is considered unreliable, the use of the evaluative data is placed in question and improvement hindered. When the gap is too great between the external sources of evaluation and the internal sources of evaluation, the learner may fall prey to one of many scenarios—"I will do this learning for you but not because there is an intrinsic value for me" or "I do not believe what you say about my work and will resist learning from you" or "I don't know how to think about my work and feel badly about myself as a learner" or "If I can't do what you want me to do, then I just won't work at all for you." Any of these scenarios leaves the learner in conflict about his or her work and creates a tension that pulls the learner away from independent learning and toward learning for approval. I am impressed with how frequently I hear people use the phrase "Won't you just do this for me?" not realizing that people might be able to do work for its value for themselves.

At the center of self-esteem is the question of worthiness—**worth**. As Freud illuminated in his discoveries, one's sense of worth comes from two life-sustaining drives—the capacity to love and to work. When we ask, "What motivates the student to perform in school?" we often forget that the most significant motivating force is the student's discovery of his or her capacity to do successful and good work. How one determines whether a student is doing successful and good work should be a collaborative process of standard setting. In most educational settings this is not the case. Rather, standards for successful and good work are set outside of the student's own sense of performance. The standards are presented to the student as an immutable fact, non-negotiable regardless of the student's justifiable reasoning about his or her own performance. When students are brought into a dialogue about standards, ownership of the evalua-

tive data is more successful. The learning targets are agreed on based on a dialogue about the quality of effort and worthiness of one's work in relation to the developing expectations of self and coach or mentor.

Our objective is to bring the learner into the evaluation process in such a way that he or she will become a partner in the learning process; a person who will be able to participate fully in the learning experience with a sense of control over its results.

COLLABORATION BETWEEN STUDENT AND TEACHER

There are many opportunities to develop evaluation as a collaborative process in the classroom. I will mention a few of the most frequently tried practices.

Conferences or Student Interviews

A conference can be a wonderful opportunity to hear how students are thinking about their own work. The quality of the conference is far more significant than the quantity of conferences. Some schools state that a student will be interviewed at least once a month. Given a class size of between twenty-five and thirty students, a teacher in an elementary school will be required to have one conference a day; in a secondary school it may require four or five conferences in a day. Each student is assured an opportunity to discuss his or her work with a teacher on a monthly basis. In addition, some schools have required that teachers also talk with one parent every day. Regardless of whether a student is in particular trouble, has special needs, or has done something exemplary, regular conversations about student work are built into the daily life of school. Other teacher conference time is provided by allowing students to do independent work during conference time. Or perhaps students may be engaged in group work. Some teachers provide time for student peer conferences as a regular part of their work with students. At this time, students conference with one another about their work and the teacher pulls aside individual students for conferences. Group interviews provide another option. At this time, the

teacher pulls together a group of students and confers about their work.

Questions For An Interview Imagine that you were to have the opportunity to interview Jean Piaget, John Dewey, or Sylvia Ashton Warner. If you were able to resurrect them for only fifteen minutes, what would be your questions for them? Most of your questions would probably start in the following way:

- How do you feel about...?
- In your opinion, do you think...?
- Why do you suppose...?
- What was on your mind when...?
- Now that you have accomplished your work, what do you think about...?
- How does what you say compare to ____ in your opinion?

In other words, you would be asking questions that would elicit responses that only they could provide. You would not ask them questions that you could find the answer to through other means. You would consider the time with them so valuable that you would think of the opportunity as one in which you had access to primary source information. Any information that could be gleaned from secondary sources should not use up your precious time.

Consider the interview or conference with a student in the same light. If there is information that can be gleaned from other places, then why use your precious interview time for that? Why not consider the student, during the interview, as a primary source for you? It is only at this time that you can gain access to his or her original thinking; his or her thinking about self and work in original ways. Try constructing an interview for your student using the above starters. For example: How do you feel about reading? How does the book you just read compare to the one you read last week? In your opinion, what is the significance of learning fractions? Why do you suppose that I chose to teach the class about the Civil War?

Questions For Reflection on Portfolio One of the most significant aspects of portfolio assessment is the opportunity to reflect on your portfolio with another thoughtful person. The portfolio repre-

sents selections from a collection of a student's work. Over the course of a few months, a student collects work. The student is then asked to choose from the work examples for the portfolio. The examples in a writing portfolio might include: best final product with drafts stapled together; best example of change within drafts; and best example of risk taken by learner in trying to acquire a new skill or style. When the student chooses, he or she justifies the choice. A conference can reflect how the student has evaluated his or her work and where there are targets for growth. Sometimes the teacher will also choose best examples from the student's work. In that case, the conference provides an opportunity for the teacher to share his or her choices with the student's choices. Suppose the teacher's choices do not match the student's choices. This provides a marvelous opportunity to talk about expectations, standards, and quality of work. And what a marvelous opportunity for the teacher to understand the student's developing criteria!

Building Criteria

The whole class can participate in the development of criteria. For example, in a given project, students can collaborate, as a classroom community, in setting the standards and criteria by which they will judge the project results. These expectations should be established before the students begin their project work. In this way students are building their capacity to critique work as well as do work.

An elementary school project with a group of bilingual students focuses on building criteria for what makes a good story. The teacher and children begin to build a set of criteria for what, in their opinion, makes a good story. After they read a story together, the class discusses whether the story met their criteria. In some instances they find that they have to expand their criteria based on their reading. In some instances they find that certain criteria are specific to a story genre. After they become more skilled in their capacity to evaluate stories on the basis of established criteria, they decide to look at their own story writing in the same way. The students use peer conferences about their story writing as a basis for examining the story in light of the criteria. The levels of collaboration and evalua-

tion become a powerful learning opportunity. Students are eventually able to examine their criteria for what makes a good story with some of the criteria literary critics have used. Students may converse with literary critics and inform their evaluation process through those conversations. In this way, students are working as critical thinkers—making their evaluative judgments through informed reasoning.

Group Evaluation

When students are working in groups, they have another opportunity to develop a collaborative evaluation process. Group work requires evaluating the content of the group effort as well as the group process. Although the criteria for good group project work may be set with the class, each group may set its own criteria for good group process. The "How are we doing?" chart is an example of a group process evaluation form (See Figure 1).

Students are asked to rate themselves in one of three categories: Often, Sometimes, and Not Yet (a positive developmental way of looking at behavior). After the student has evaluated himself or herself, the activity can expand so that all of the students in the group evaluate one another and give each other feedback about their behavior. Finally, the teacher can monitor the groups with a clipboard with the same charts for each group. In that way, students can have three perspectives on the same event—self, peer, and teacher. Goals can be set for new behaviors based on interpreting the evaluative responses.

When a classroom is focusing on thinking, the process behaviors should foster better thinking. An excellent list of such behaviors is provided in Art Costa's work on intelligent behaviors (Costa, 1991). Teachers and students might generate a set of criteria for what intelligent behavior looks like. That list can be transposed onto the "How are we doing?" form (See Figure 1).

ESTABLISHING SCHOOLWIDE STANDARDS

If teachers and students are collaborating in the evaluation process, how does this begin to translate

to schoolwide criteria and standards? This is an excellent initiating conversation for a schoolwide discussion. Usually the discussion starts from another perspective—what standards we establish (or the state or district establishes) that we require of our students. I am suggesting that we reverse the process and that we start in collaboration with students and work our way out from the classroom to the school to the district and to the state. If we reframe the question from this perspective, we may learn something new about accountability. We may learn something more about how to encourage student accountability and self-evaluation in relationship to the larger set of expectations that surround students and their work. We may also provide a more constructive framework for instruction in relationship to student learning because teachers will stay closer to the authentic, daily performance of the work of students as they develop their criteria for evaluation. When teachers bring the data from their classrooms to the whole-school discussion on standards and criteria setting for evaluation, the discussion remains closer to the realities of the classroom. The whole school can engage in conversations based on the work of students rather than impressions of what ought to be. To emphasize this point, the following situation occurred in an elementary school. A group of teachers brought writing from kindergarten through sixth grade classes. They had agreed that one of the ways that they would produce a common experience for discussion would be to provide the students with a writing prompt. In that way, all students would submit their writing sample for examination. The prompt they used was offered in early November: "Suppose you were the last turkey in the barn—describe your feelings and experience." Children were encouraged to draw as well as write and adults were available to capture stories from nonwriters. The teachers, one from each grade, came to the meeting with their class's writing samples. They were asked to switch papers so that no one scored their own set of papers. The task was to choose the best three examples of writing from their twenty-five or thirty samples. One of the first questions a teacher asked was, "Suppose you cannot find three best pieces?" The teacher's ques-

HOW ARE WE DOING?

ATTRIBUTE: FLEXIBILITY IN THINKING

OBSERVABLE INDICATORS	OFTEN	SOMETIMES	NOT YET
Is willing to change her or his mind			
Accepts another point of view ("I agree..." "I understand..." "I see...")			
Accepts or offers multiple solutions to the problem			
Is able to change focus without panic or fretting			
Is able to compromise (gives up "ownership" or role)			
Is willing to consider more than one thing or source at a time			
Is willing to accept that there may not be an answer			

Source: Bena Kallick, Westport, CT.

HOW ARE WE DOING?

ATTRIBUTE: OVERCOMING IMPULSIVITY—
DELIBERATIVENESS

OBSERVABLE INDICATORS	OFTEN	SOMETIMES	NOT YET
Listens to directions before starting			
Listens to response of others and does not repeat what has been said or asked			
Asks questions to clarify the task or direction			
Decreases number of erasures			
Reduces the number of unnecessary, repetitious questions			
Analyzes the problems and develops a plan (uses visual strategies—e.g. mind map)			
Thinks before answering			
Takes time to use thoughtful, precise language			
Can paraphrase when called upon			

Source: Bena Kallick, Westport, CT.

HOW ARE WE DOING?

ATTRIBUTE: PERSISTENCE—Persevering when the solution to a problem is not immediately apparent

OBSERVABLE INDICATORS	OFTEN	SOMETIMES	NOT YET
Stays on task			
Seeks alternative sources of data			
May take a break, but returns to task			
May say "Don't tell me, let me figure it out"			
Shows intensesness of thought			
Says, "Wait a minute, I want to finish"			
Completes task or project			

Source: Bena Kallick, Westport, CT.

HOW ARE WE DOING?

ATTRIBUTE: LISTENING TO OTHERS—
With understanding and empathy

OBSERVABLE INDICATORS	OFTEN	SOMETIMES	NOT YET
Maximizes eye contact			
Pays attention			
Paraphrases others' responses			
Demonstrates body language (e.g., nods approval, sits up, etc.,)			
Asks questions related to the topic			
Responds by actions or words			
Gives accepting response (the way in which the responses are given)			

Source: Bena Kallick, Westport, CT.

Figure 1 "How are we doing?" chart

tion reflected external standards for a good piece of writing, standards not based on the work of the children in the classroom. Suppose none of the children meet that expectation? In fact, the task was to choose a relative measure from within the population they were given. It is not difficult to see how that attitude begins to translate to (1) expectations for students that do not match the capabilities of students, (2) disappointment that the students' work is not "good enough," (3) when accepting the student's work, feeling as if one has lowered one's standards, and (4) having difficulty providing realistic learning stretches from within the students' work.

The teachers finally got to the task and chose the three best pieces. We then, starting from the kindergarten class and moving through to the sixth grade class, described the characteristics that made those pieces "best." At the end of the exercise, we had an interesting story of the development of writing for these students. We could then compare that to what theorists in the writing process were suggesting. We had established a knowledge base about our students that provided a lens through which we could examine the work of other practitioners and theorists.

Two additional powerful insights came from this experience:

The teachers were viewing the work of the children in early November against last year's class in June. In other words, what they remembered as the performance of their last year's class at the end of the year, they were carrying into their expectations for this year's class at the beginning of the year. One of the most difficult aspects of losing a class in June is that you just about have them where you want to see them and you have to let them go and start all over again!

The first grade teacher exclaimed when she got her class's papers back—"I am amazed that these are the best three examples—they are my worst readers!" This teacher revealed the bias we bring to viewing our students' work—a bias that often remains

hidden in our grading system. The teachers all agreed that it was important, especially if they were looking for a collaborative understanding of evaluation in the school, to read and evaluate each other's student work at least once a month.

Instituting practices that facilitate teachers' talking about criteria, standards, and evaluation practices is one powerful way to change the accountability system. Such practices as evaluation study groups, teacher-as-researcher groups, or teachers working in partnerships with one another to exchange papers all can be organized as a part of staff development.

DISTRICT STANDARDS

As these conversations grow out of individual schools, they can be a part of the development of a school-based management system that reports to the superintendent. At the central level, the district can orchestrate school-based understandings and, through collaborative processes, can arrive at realistic expectations for students at elementary and secondary levels. The orchestration of curriculum, instruction, and assessment practices is a necessary part of school accountability. But a little voice is saying to you right now, "What about the state?" The state might also reverse its perspective. Rather than developing the accountability measures, it might see its role as facilitating district processes for greater accountability. The state might serve as a legitimizing agency for district practices. In that way, the state might establish policy for criteria for a solid evaluation system or process rather than trying to establish procedures for measuring what might be differing strategies of instruction and—in some states where there is not a statewide curriculum—differing curricular requirements.

CONCLUSION

The process of collaboration should be thoughtful enough to improve learning and teaching. We know that the process of evaluation presently in place is seen as detracting from teaching and learning. The measures that are mandated are often

perceived as punitive, not authentic, and do not adequately describe what teachers and students value. By developing collaborative processes for setting evaluation standards, we can enlarge our understanding of what it means to examine a human process as dynamic and complex as learning. We

can learn to value more than one perspective regarding the question of standards. And finally, we may make our way out of an accountability process that represses rather than enhances thinking at all levels of the educational enterprise.

REFERENCES

- Chittenden, E. (1990). Young children's discussions of science topics. In G. E. Hein (Ed.), *The assessment of hands-on elementary science programs* (p. 220-247). Grand Forks, ND: North Dakota Study Group on Evaluation.
- Costa, A. (1991). *The school as a home for the mind*. Palatine, IL: Skylight Publishing.
- Duckworth, E. (1978). *The African primary science program: An evaluation*. Grand Forks, ND: North Dakota Study Group on Evaluation.
- Goodman, K., Goodman, Y., & Hood, W. (1989). *The whole language evaluation book*. Portsmouth, NH: Heineman.
- Hein, G. E. (Ed.). (1990). *The assessment of hands-on elementary science programs*. Grand Forks, ND: North Dakota Study Group on Evaluation.
- Kallick, B. (1989). *Changing schools into communities for thinking*. Grand Forks, ND: University of North Dakota Press.
- Wiggins, G. (1989). A true test: Towards more authentic and equitable assessment. *Phi Delta Kappan*, 70, 703-713.

HOW DO WE KNOW WE'RE GETTING BETTER?

Sharon Jeroski and Faye Brownlie

The minute we begin to articulate our feelings, ideas, and judgments about a piece of literature, it begins to take another shape. We see things we had not seen before, and we begin to forget those things that do not relate to the account we are giving of the story. This is true whether we are simply retelling the story to friend, asking a question of a trusted colleague, expressing our opinions to a stranger on the street, or pausing a moment to talk silently to ourselves about what we have just read.

—(Nelms, 1988, p. 7)

Teachers today are struggling to reconcile their beliefs about how students develop as thoughtful, responsive readers with their need to offer clear evidence that students are becoming “better” readers. It seems clear that traditional indicators such as standardized test scores, percent correct, or rank-in-class do not offer the kinds of information teachers find helpful in supporting students who are actively constructing meaning as they read. What features might characterize assessment of authentic achievement in reading real accomplishments of active, responsive readers?

- The student makes critical choices about such features as materials, use of time, and representation of response.
- The student makes connections with previous knowledge and experience in shaping a response.
- The student personalizes the reading experience and shows some depth of understanding.
- The student's response reflects or stimulates thoughtful interactions about the reading experience.
- The text and the response task are meaningful to the student.

MAKING CRITICAL CHOICES

Active readers are continually making choices—choices about what they will read, when they will read, and how they will read. They also make choices about what they will do with their reading—how they will respond and represent their ideas, and whether or not they will seek an audience.



Figure 1 Miya Kondo's Response to a Poem

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In working with young readers, we very quickly discovered that assessing and evaluating their development was much easier when we encouraged them to make their own choices. Rather than offering carefully structured reading assignments, we began inviting the students to use their feelings, ideas, and images to demonstrate their understanding of a reading. Freed from our expectations, the children responded in wonderful and diverse ways. In Louise Zappitello's primary classroom, children aged six to nine have frequent opportunities to make choices about their reading and their representations.

Miya

Miya is an eight-year-old author and illustrator who is strongly drawn to the imagery of poetry (See Figure 1). Miya explained, "I thought it would be fun to show you what the bug was thinking. I put myself

into the bug's mind and I got a really strong picture of the kind of town it might like." Miya's illustration offers a delightful personal perspective with "Les Miserables" playing at the local Bug Mall. Miya's "bug"—like Miya herself—is enjoying the images it has created.

Miya is also the principal illustrator of the collaborative novel she is working on. "I write the words and draw the pictures; they [her partners] color them," she explains. The novel features three beautiful, rich, and independent young women who move from one fortunate adventure to another. It is carefully written and exquisitely illustrated.

Stina

In the same classroom, Stina (who is collaborating on a mystery novel) chose to read and respond to a poem about a dog "thin as a rail" whose fleas hop

ANSWERS AND QUESTIONS

1. What did you read about?

the moon

2. Tell two things you learned.

a. it gets light from the sun

it is like a mirror

b. it makes one trip in 4 weeks

the moon is much closer to earth than
one star it is closer than the sun that
is why it looks so big3. What questions do you have about it? Try to think of two questions you
could ask the author.a. how did you get all this
vitall informashon?b. how many times does the moon
travall arond the earth in a
generashon

Figure 2 Stina's Answers and Questions

from the bottom to the top whenever he waves his tail. Stina wrote:

I wonder why he only hase flees on his tail but if he hase fles on his tail why whene he waves his tail they don't go all over his body. If he is as thin as a rail he must not be a healthy dog. where do the fleas that are on the top go whene he waves his tail.

Stina has a dog and she is intrigued by some of the detail in the poem. In conversation she explained that her dog sometimes had fleas, but he was much healthier than the dog in the poem. Stina is characteristically curious—she poses a number of questions that demonstrate her connections to what she already knows about dogs: Why does he only have fleas on his tail? Why when he waves his tail don't they go all over his body? As an author, Stina is currently much more interested in exploring and playing with language and ideas

than with illustrations and images. We see these choices extending to her novel, which she and her partner, Tim, have been working on intermittently for several weeks.

Stina and Tim are obviously enjoying their collaboration, although they explain that they sometimes get tired of their book and stop writing it for a week or two. It features a complex Halloween/mystery plot and they explain that they usually get their ideas by talking together, "but sometimes when we're writing we really don't know what's going to happen." Although they are keen to find a new audience for their novel, they have obviously had so much fun writing it that sharing it is almost anticlimactic.

Stina's enthusiasm for language and learning is also apparent when she selects **answers and questions** as a way of demonstrating her understanding of a selection about the moon (See Figure 2

ASSESSING SIGNIFICANT OUTCOMES

above). (Children were offered four choices: illustrating; writing a note to someone at home; writing about the new information they learned; or answers and questions).

Although the assignment asks for two pieces of information, Stina includes as much as possible. Her questions are delightful—clearly the questions of a developing author who loves language. She wants to find out where the author got all this vital information and how many times the moon travels around the earth in a generation.

The wide range of representations of thinking reflects the opportunities present in the classroom. These children recognize their ability to both choose from among a repertoire and to apply their choices in a variety of contexts. All of the children were able to choose both reading material and ways of responding and representing without teacher support. This was definitely a skill that had been practiced. Louise frequently meets with her class to talk about their shared reading, the independently chosen books they are reading, and the choices they make when they represent their ideas. Discussion focuses around questions such as:

Choosing Books:

- How did you pick that book? Was it a good choice for you?
- Who do you know that might like this book? Why do you think they would like it?
- Do you ever give other people advice about books and stories they might like? Who do you give advice to? Do you think your advice helps them?
- Who tells you about good books to read? How do their ideas help you?
- What books have surprised you—books that you thought you might not like that turned out to be interesting? Books that you thought you would like but found out you didn't?
- What do you do when you find you have made a mistake in choosing a book?
- What do you usually do when you finish reading a book? (Do you tell other stu-

dents about it? Write about it? Read it again?)

Choosing Responses:

- What are some of the ways you like to represent your ideas?
- What are some of the ways you like other people to represent their ideas when they are sharing with you?
- How do you like to represent your ideas when you are working with a partner? With a group? With an older or a younger buddy? Outside of school?
- What kinds of representations do other people ask you to help them with?
- What kinds of representations do you avoid? What kinds would you like to be better at?
- What kinds of responses or representations does your teacher usually like best?

(Adapted from *Thinking in the Classroom*, Ministry of Education, 1991.)

The teachers and students we work with value and monitor the choices they make through their oral and written reflections in conferences, learning and thinking logs, portfolios, and classroom sign-up sheets where they indicate the genres, books, stories, and forms they are currently exploring (See Figure 3).

MAKING CONNECTIONS

Connecting—between the known and the unknown, with others, with personal experience, and with the world—is fundamental to assessing growth in learning. Children can be encouraged to connect their prior experiences with reading by activities such as in Figure 4.

The importance of the connections is made explicit by the teacher's question: "Does the information agree with your ideas?" Jenna, a seven-year-old in Lynn Hoeteker's class, clearly indicates that while reading, she has held her prior knowledge in mind and looked for substantiating evidence (See Figure 5).

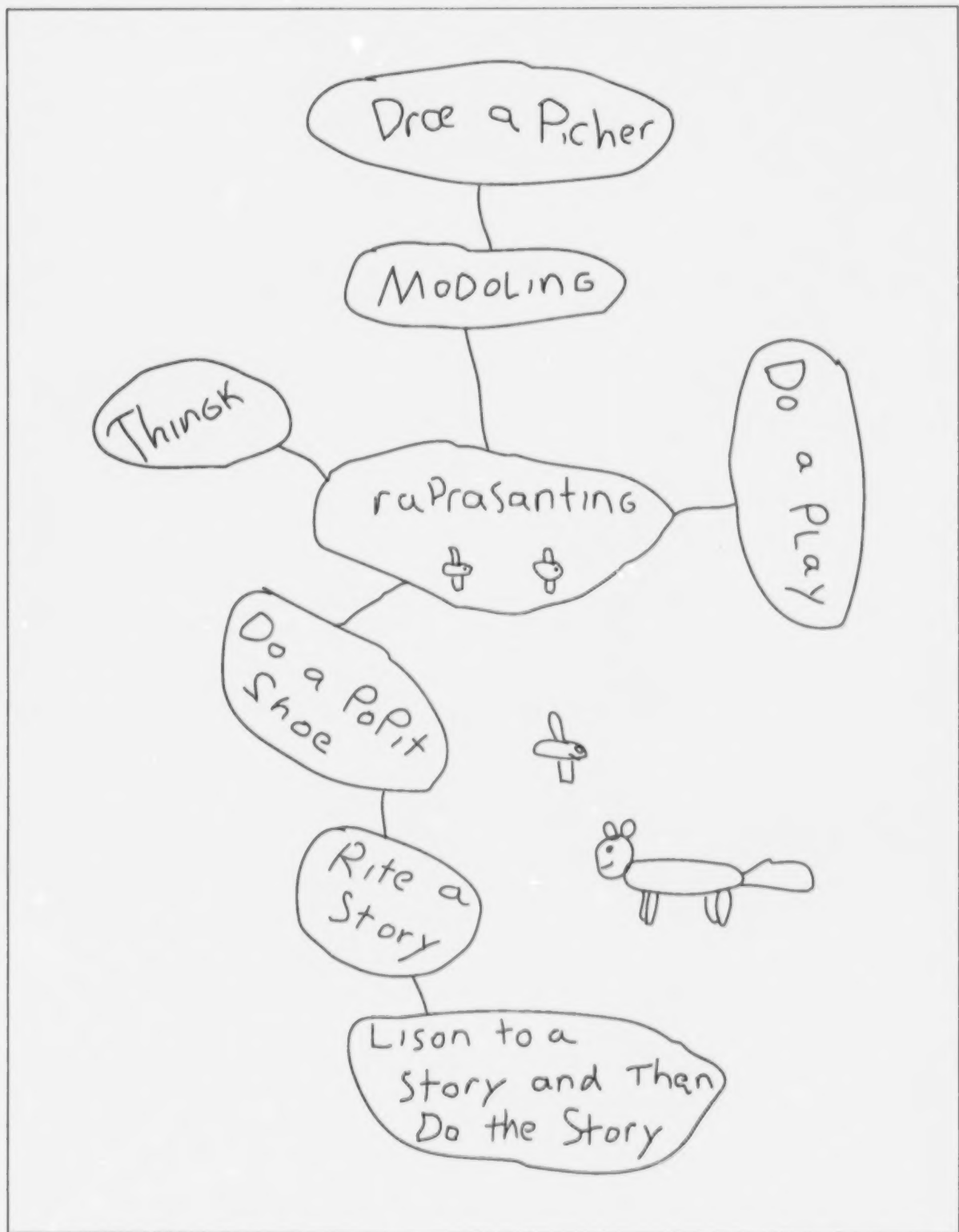


Figure 3 Student's Diagram of Representations

BEFORE YOU READ "FROGS AND TOADS"

Read each sentence with your teacher.

Think over the sentence.

Circle "agree" or "disagree" to show your opinion.

Be ready to say why you think this way.

1. Frogs and toads are the same.	Agree	☒ Disagree
2. Frogs lay eggs.	☒ Agree	☐ Disagree
3. Toads' babies are called tadpoles	☒ Agree	☐ Disagree

Figure 4 Activity Sheet to Encourage Connection Making

But there is more to reading than just connecting with what you already know. Readers also can learn new things and wonder about others. Jenna's thinking is extended by her teacher's prompts (See Figure 6).

These prompts provide connections to the world outside the classroom—now Jenna is searching for new connections.

In Linda Kaser's classroom, students examine their independent reading from three perspec-

Read "Frogs and Toads." Does the information agree with your ideas?

1 agree

2 Yes because it showed an egg and there was some information on the egg

3 the author agreed because he said that the egg turns in to a tadpole

Figure 5 Jenna's Response to Reading "Frogs and Toads"

ANSWERS AND QUESTIONS

1. What did you read about?
frogs and todes
2. Tell two things you learned
 - that frogs don't only eat flies
and mosquitoes
 - frogs lay jelly eggs
3. What questions do you have about it? Try to think of two questions you could ask the author
 - why do frog and todes
leap high
 - what do tadpoles look like
when they just com out of an egg

Figure 6 Jenna's Answers and Questions

Title: IN A ROW Author: Stan & Jan

Favorite Sentence: Hi Tom Sister Bear
geenie smiled too but it wast
exactly friendly siste bear she
said now what kind of name is that

Liked: because this new cub came
and starts piking on some
of the kid like sister
bear and some of her friends

Learned: one's sense of self-wor
is often unde one the fist
time one feels left out of
the fun and I learned that
you shued pick on some one
youger then you because
it will soon tren around
and see how it feels
thats happed to me one time.

Figure 7 Michael's Response to a Reading

ASSESSING SIGNIFICANT OUTCOMES

tives: a favorite sentence, what they liked, and what they learned. Michael was able to respond from all three perspectives (See Figure 7).

Michael's "learned" reflection connects the experience of the character not only to a global lesson (not to pick on someone younger than you) but also to his personal world (that's what happened to me one time). Michael chose a book that was meaningful to him: Linda offered a task that supported him in making sense of his reading. In turn, he provided her with clear, valid information about his development as a reader.

Another way to examine the connections with content or expanding bodies of knowledge is through learning log prompts such as "I used to think...but now..." Reflections such as this help students recognize their need to make connections and adapt existing schema as new learning reconnects and reshapes information. For example, after studying a unit on trees, two eight-year-olds in Laura Smith's library reflected:

I used to not know that trees had patterns but now I know that they do. I can tell the difference of the trees because of the patterns. I used to think trees were not useful, but now I know they give us paper and oxygen.

I used to think all the trees had...leaves. But now I know not all trees have leaves—they have needles. I used to think trees weren't useful. But now I know they breathe carbon dioxide.

Collaborative Connections

The power of collaborative learning is emphasized by prompting students to reflect on their connections with others in the class. Notice how this six-year-old's entry informs us as to what students know about learning—the value of expertise, the willingness of people to share their ideas, and the strengths of individuals within groups.

Jay has tote me. I think more than I hanjrid things abuot ANTS.

(Jay has taught me. I think more than 100 things about ants.)

Teachers' questions help students to make connections in their reading and thinking.

- What did we do today that helped us to become better learners? How did it help?
- How can we use what we learned?
- What did you notice about your thinking in this class today?
- How can you use the reading and thinking strategies we worked on today in your other classes? Outside of school? At work?
- Who helped you today? Whom did you help?
- What did you like about your reading today? What was challenging in your reading today?
- What was something you learned from reading that surprised you?
- What are questions which you are still curious about and would like to find some answers to?
- What are new questions you thought of after talking to your group?

DEPTH OF UNDERSTANDING

What kinds of indicators are appropriate for describing the depth and personalization of students' responses to their reading? We developed the following criteria and categories from the responses of students from ages eight through seventeen (Jeroski, Brownlie, & Kaser, 1990). The scales can be adapted to any age: for example, we have found it more helpful with younger children (ages four to seven) to describe three levels of responses (powerful, developing, and supported) rather than the four listed below (Jeroski, Brownlie, & Kaser, 1990).

The scoring guide and comments offer models for teachers and students to use in developing criteria in their own classrooms. The samples reprinted in Figures 8, 9, and 10 are from sixth grade students who had responded to a poem entitled "The Wild Wolves of Winter."

Powerful

The response is personalized and thoughtful. The student integrates previous experience and includes specific references to the text. The ideas expressed go beyond the text, describe the comparisons or metaphors, and indicate a

SAMPLE POWERFUL RESPONSE: John has captured the events of the blizzard and the howling wind in his drawings. The stark comparisons between the wolves' power and the people's helplessness are portrayed.

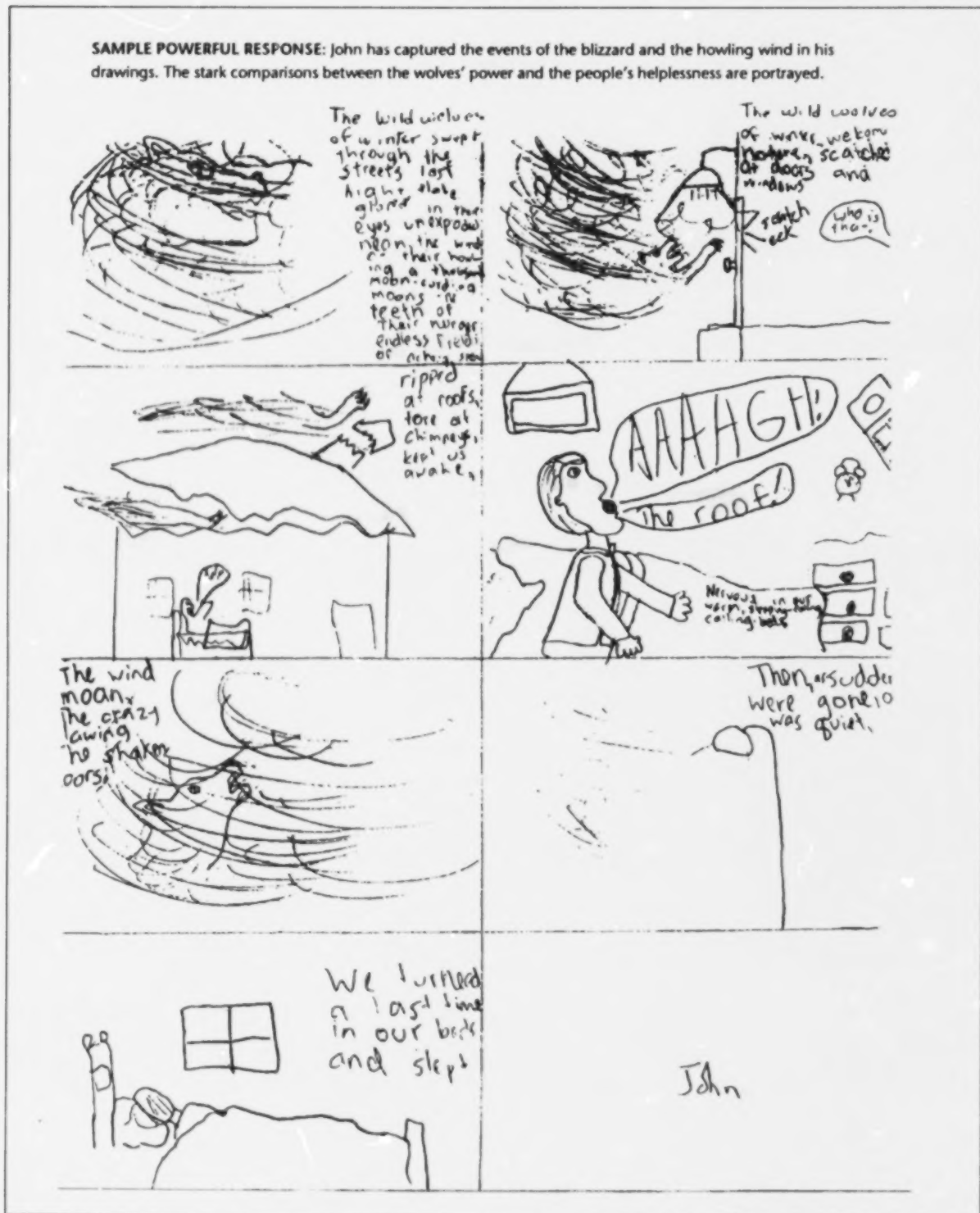


Figure 8 Student Response to the "Wolves of Winter"

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ASSESSING SIGNIFICANT OUTCOMES

SAMPLE PARTIAL RESPONSE: Lauren identified with the poet, the sleeplessness, and the fear, but she attributes this all to a pack of wolves. She has not recognized the wolves as representatives of a winter wind.



life for me is scary because packs of wolves keep on coming through my village. My life is also very sleepless because the wolves scratch at my door every night and keep me awake. I wish that the wolves will go back were they came from.

Lauren

Figure 9 Student Response to the "Wolves of Winter"

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SAMPLE COMPETENT RESPONSE: Jim understands the metaphor of the blizzard, but does not provide much detail in his description of it. He uses text information and personally responds to the fierce wind.

I think in the poem "The Wild Wolves
of Winter" the wolves wher like a
blie zard. The scratches at the door
are like when the wind blows and you're
all allone you Could almost think
there was someone at the door. The
poem is good

Jim

SAMPLE UNDEVELOPED RESPONSE: Lindsay attempts to interpret the wolf in the poem, but misses the intent and seriousness of the poet.

The Wild Wolves Lindsay
of winter

I think this poem is about a
person wearing a wolf skin
jacket trying to stay intsead
of outside in the cold.

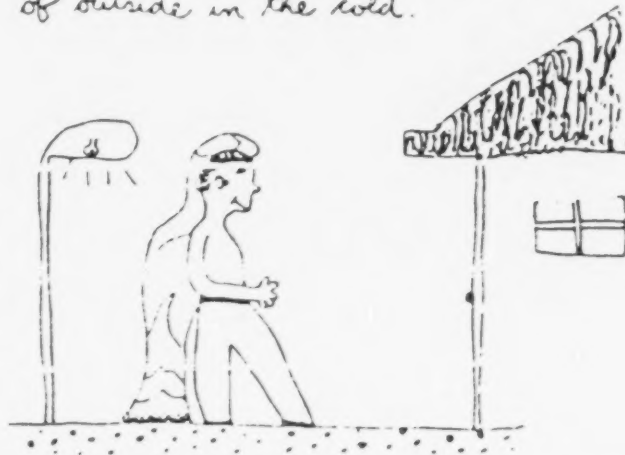


Figure 10 Student Responses to the "Wolves of Winter"

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ASSESSING SIGNIFICANT OUTCOMES

relatively deep or sophisticated understanding of the selection.

Competent

The response is consistent and logical and features some integration of previous experience and includes text references. The student may focus on one aspect of the poem, not describe the metaphor, or deal with the idea on a surface level.

Partial

Some inconsistencies are apparent, suggesting a partial or incomplete understanding of the poem. Typically, the student makes less frequent use of images, emotions, and specific text references.

Undeveloped

The response is inconsistent or illogical. The student may offer broad general statements without explanation. If any text references are included, they may be inappropriate or illogical.

THOUGHTFUL INTERACTIONS

Student interviews are one way of finding out what students think about their developing competencies, what their personal evaluation of their growth is, and what support is needed to continue to enhance their language development.

Colin is a seven-year-old reader. He has practiced reading the age-old tale "The Turnip" and has now taped this reading. He is interviewed by his teacher on his reading of the selection. His reading has been very expressive. Each time he came to the repeated line, "But the turnip wouldn't budge," the line became louder and more expressive. He made one miscue—"hungry" for "huge" but corrected himself after realizing that it was unlikely the turnip being pulled from the ground was "hungry."

Teacher: What did you think about your reading on the tape?

Colin: Quite good but for one word when I was practicing it. I felt a little better, then I made a couple of mistakes but I corrected them.

Teacher: Can you tell me about those mistakes?

Colin: Hungry didn't make sense...a man pulling up a "hungry" turnip. So I asked my Mom and she said it was "huge," so I just remembered it. I practiced a couple of times on our way out to dinner and I just kept getting better and better at it. I guess it was quite great except leaving out the "huge" or "hungry."

Teacher: What would you like me to notice about your reading when I am listening to the tape?

Colin: My voice and stuff and how smoothly I was. How it is important in my voice that I put life into it. For example, "But the turnip wouldn't budge!" I make it like it's alive.

Colin's response clearly indicates what he values in his reading development. He prepares to read for an audience, recognizes the entertainment value of real reading, practices for improvement, reads for meaning, and checks with others when he needs support. His ability to talk about his reading with such clarity helps us continue to support his growing independence as a reader and a thinker.

Thoughtful interactions between students and teachers can also occur in print. A critical element in keeping the interaction thoughtful is asking real questions of a real audience with a real purpose.

The following two letters are samples from a second grade class after the Canadian Fitness Test. The teacher had been away for the testing day so the substitute teacher asked the children to write to Miss Kaser, describing their participation in the events.

Dear Miss Kaser,

I slept in this morning and I missed the Canada Fitness Test. I felt a little sad, but I didn't worry and if I was in it I would know that I would do very well on every one of them.

Love, Bonnie

Dear Miss Kaser,

I liked Canada Fitness because I felt I did better than last year. I mostly liked the shuttle run because you got to pick up bean bags and drop them. I mostly

liked the 50 meter run because I liked being timed and running through the two cones. When I ran it was like running through two lion statues only with one colour and one eye as round as round can be. The thing I didn't like about Canada Fitness was me and my partner always had to line up last.

from Elsa

Both letters show the students' understanding of the effect of their actions on their performance and their positive performance image. Strong personal voices come through in their letters. They are obviously used to being carefully listened to and are attempting to write to Miss Kaser about what she would want to hear about them.

Julie Davis, a high school English teacher, asked her students to tell her in writing the kinds of questions they most liked to respond to. These are two responses:

I like a question that is slightly cryptic and makes you think. Another question I like is one where there is no correct answer, you just have to let your ideas flow smoothly.

Puzzles have always appealed to me for the simple reason that you know there must be an obvious answer, though it may be hidden.

I hate questions that require a choice of yes or no, for I have learned that there is a compromise, a mutual area, between the absolutes.

Many likes and dislikes of questions originate over the topic.

Deanna

Deanna's response indicates not only that she has carefully thought through her preferences, but that she has also experience with questions which invite reasoning.

My favorite kind of question is one that takes as little time as possible to do. The reason is because I'm always busy and have better things to do than answer big silly useless, school, brainstorming problems. Although I like to tackle practical problems that can be done with ingenuity and skills.

Scott

These are real questions for a real world. Scott's perspective refocuses us on the number of questions which are asked in school by people who already know the answers to their questions.

Another combination is that of the unknown audience, the conversation with someone whom you may know less well. In Linda Hoffman's fourth grade class, the students were writing 'Dear Reader' letters to insert at the beginning of their thinking logs. The purpose of the letter was to guide the reader when he or she looked through the log. Of particular interest in these letters is the students' sense of pride in their accomplishments and their means of describing what they really value in their learning.

Dear Reader,

This is my Thinking Log. I put a lot of work into this so please don't look for spelling, coloring, etc. Some of the things I would especially like you to look at is the ocean garbage one because I think it is wrong to make a dump out of a gorgeous ocean and killing all the ducks and fish. And another thing I would like you to read is the front page of my book it is how I felt about learning at the beginning of the year and I still feel the same way about learning and even better!

Yours truly, Radel

Dear Reader,

I want you to read my book and see if you can find out how my feelings were when I did my Brain, my Collage, my kindergartin and my feelings poem and if you would have the same feelings. The one that I felt best about was thinking inventory. I thought that was my best creative thing. I like it because it showed what I like to do, what my dream was and what I think will happen to me in the future and that's what I think is important. I also think my learning has changed when I have to give a straight answer my learning isn't that different but when I can give all my ideas about it I think it shows you where I've changed in my learning.

Thanks, Dustin

ASSESSING SIGNIFICANT OUTCOMES

These letters reflect not only the sense of writing for a real audience, but students who have learned from a series of thoughtful experiences and interactions with one another and their teacher throughout the year.

MEANINGFUL TASKS

The ultimate goal of most reading instruction is the development of thoughtful, independent readers—readers who understand and respond to what they read and who are able to integrate and extend each new reading experience in a meaningful way. This understanding and response can only develop when children are engaged in reading texts which they find to be worth reading—because the readings are personally meaningful, entertaining, or enjoyable, useful in accomplishing some purpose, or represent a milestone of some kind to the reader.

The children whose work appears in this chapter were able to make effective choices and develop rich responses because they were engaged in activities that were important to them. They were able to make choices about the form their work would take; it is equally important that they were able to focus on developing meaning. Having initiated a frame of reference, they were able to pursue their ideas until they were satisfied with the result. For example, when Miya and Stina responded to the poems, they completed their representations relatively quickly in order to share them with their visitors; writing their novels, however, extended over several weeks.

Like Miya and Stina, all of the children and teachers we work with assume that reading, responding, representing, and sharing will make sense to them. Although they may struggle with some of the texts they read and the tasks they work on, the struggle is always toward **meaning** (rather than toward “correctness”).

Although often students develop their own response tasks, we frequently ask them to work within a structure we provide, especially if they have been practicing or reviewing a particular strategy. We try to ensure that the tasks are open-ended and able to accommodate a range of learners and developmen-

tal stages. For example, working with a number of multi-age primary classrooms (our education system in British Columbia features ungraded, continuous progress during the first four years of school) we offered six response options for poems Miya, Stina, and other children were reading:

Listen-Read-Respond

Listen to the poem. Try to make pictures in your head. Tell someone about the pictures you saw. Read the poem yourself. Let new pictures come to your head. Show your ideas. You can write or draw.

Spider Webs

You are going to make a spider web of words, pictures, and ideas! Write the name of the poem in the middle of a blank page. Circle it. Write some words or pictures it makes you think of. Make lines to join them to the name of the poem. Read the poem. Look for words in the poem that give you strong pictures or ideas. Add more words and ideas to your web. Show your web to a friend. Tell about it.

Partners in Poetry

Find a partner. Read the name of the poem together. With your partner, make up two questions about the poem. Read the poem together. Talk about your ideas: What parts did you like? Were your questions answered? Read the poem again. Decide how you will show your ideas. You can use both words and pictures. You might make a web or a cartoon. Work together to show your ideas.

I Noticed, I Wondered, I Liked

Read the poem. Close your eyes and let ideas come into your head. Read the poem again. You can write or draw on the page if you want. Tell one thing you noticed about the poem. Tell one thing you wondered about or wanted to know. Tell one thing you liked.

Take A Poem Home To Meet Your Family!

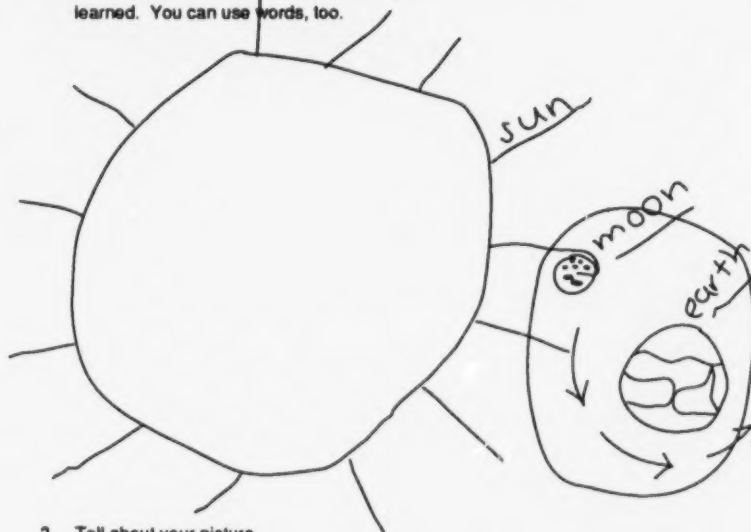
Find a poem you would like to take home to read with your family. Read the poem to some-

READING AND DRAWING

1. What did you read about?

The moon

2. Draw a picture or cartoon that shows your ideas and what you learned. You can use words, too.



3. Tell about your picture.

The sun is bigger than the moon and the earth. The earth is bigger than the moon. It is cold and rocky on the moon. The earth + moon go around the sun.

Figure 11 Steven's Reading and Drawing Response

one in your family. Talk about your ideas and the pictures in your head. Remember to encourage other people's ideas. Let them read the poem to you. Work together to show your ideas in pictures or words. Write a notice together telling your teacher how you got along.

Show Your Ideas

Read the poem. Remember you can doodle or draw as you read. Think about the words and ideas. Read the poem over and over again. Show your ideas, feelings, and pictures. You

can use words, pictures, cartoons, webs or anything you like.

Responses to all of these options can be connected to a rating scale similar to the one described in "Depth of Understanding" above. That would, of course, be determined by the teacher's purpose in providing assessment feedback.

Steven, who is eight, read the selection about the moon which prompted Stina to ask, "How did you get all this vital information?" Steven, however, brought quite different experiences and interests

to the activity, and created meaning in a way that made sense for him (see Figure 11).

Steven is interested in how the universe works. He likes books about space and understands that some kinds of information are most clearly conveyed in a diagram. Steven spent quite a bit of time figuring out exactly how best to develop his diagram. He is pleased with the result: "Now I can show other people how the earth, sun, and moon move. My picture will help them understand when I explain it."

Readers and writers **do** work toward meaning. The kinds of trivial, artificial, and disconnected tasks that once masqueraded as "reading comprehension," were, in fact, unlikely to tell us anything about how young readers created meaning. This is because there was no real meaning to create—all too often, it was just a trick. On the other hand, when we invite children to participate in activities that make sense to them, we develop insights into both **how** they understand and **what** they understand of the world of print.

REFERENCES

- Archbald, D. A., & Newmann, F. M. (1988). *Beyond standardized testing: Assessing authentic achievement in the secondary school*. Reston, VA: National Association of Secondary School Principals.
- Brown, R. (1991). *Schools of thought*. San Francisco, CA: Jossey-Bass.
- Brownlie, F., Close, S., & Wingren, L. (1990). *Tomorrow's classroom today: Strategies for creating active readers, writers, and thinkers*. Portsmouth, NH: Heinemann.
- Brownlie, F., Close, S., & Wingren, L. (1988). *Reaching for higher thought: Reading, writing, thinking strategies*. Edmonton, AL: Arnold Publishing Ltd.
- Jeroski, S., Brownlie, F., & Kaser, L. (1990a). *Reading and responding: Evaluation resources for your classroom*. (Vols. 1-2: Late primary and primary). Toronto, ON: Nelson Canada. (Available in the U.S. from The Wright Group, Bothel, WA.)
- Jeroski, S., Brownlie, F., & Kaser, L. (1990b). *Reading and responding: Evaluation resources for your classroom*. (Vols. 1-3: Grades 4, 5, and 6). Toronto, ON: Nelson Canada. (Available in the U.S. from The Wright Group, Bothel, WA.)
- Ministry of Education. (1991). *Thinking in the classroom: Resources for teachers*. Victoria, BC: Ministry of Education.
- Nelms, B. F. (Ed.) (1988). *Literature in the classroom: Readers, texts, and contexts*. Urbana, IL: National Council of Teachers of English.
- Perrone, V. (1991). *Expanding student assessment*. Alexandria, VA: Association for Supervision and Curriculum Development.
- Smith, F. (1991). *To think*. Columbia, NY: Teachers College Press.

ASSESSMENT: A THOUGHTFUL PROCESS

—
Steven Ferrara and Jay McTighe

The development of student thinking abilities has been recognized as a basic educational goal for the information age (Secretary's Commission on Achieving Necessary Skills, 1991; McTighe & Schollenberger, 1991). With this recognition in mind, many teachers are seeking to involve their students in the meaningful application of knowledge and skills, rather than simply having them memorize facts. These teachers seek to create a thoughtful classroom in which students assume a greater responsibility for constructing meaning for themselves. Such a classroom emphasizes active learning, involving students in working together to examine issues, solve problems, and communicate ideas. The teacher adopts a more facilitative role, guiding students in individual and group work, rather than merely dispensing information.

In addition to changing classroom expectations and the role of teachers and students, such an instructional orientation has implications for the ways in which student learning is assessed. A greater emphasis is placed on the use of assessments that involve students in more "authentic" tasks¹, measure a variety of important learning outcomes, and reflect effective instructional models. Unfortunately, many teachers find that they have

received little relevant training in methods of classroom assessment (Stiggins, 1991), either through university coursework or inservice workshops.

In this chapter, we focus on the classroom as we examine principles of sound classroom assessment, introduce a planning process and a framework for selecting appropriate assessment methods, and provide illustrations of the process and framework in use. Rather than examining specific assessment methods in detail, our concentration is on helping teachers develop thoughtful classroom assessments.²

PRINCIPLES OF SOUND CLASSROOM ASSESSMENT

The term *assessment* refers to "any systematic basis for making inferences about characteristics of people, usually based on various sources of evidence; the global process of synthesizing information about individuals in order to understand and describe them better" (Brown, 1983, p. 485).³ Inherent in this definition is an important principle, namely that sound classroom assessment practice requires multiple sources and types of data. Applied to the classroom assessment context,

ASSESSING SIGNIFICANT OUTCOMES

this principle reminds us to rely on more than paper-and-pencil tests to gauge student learning.

To examine the principle of multiple data sources more fully, let's use a photographic analogy. Think of an experience in which someone took a candid photograph of you. You may have been happy if it "captured" you in a pleasing manner. On the other hand, perhaps you were a bit embarrassed because the image was not particularly flattering. In fact, it may have been downright awful, and you may have attempted to get it back so that others would not see it! In either case, would you be willing to say that this single photograph effectively portrays you? At best, it presents a picture of you at a single moment in time within one particular context. In a similar way, the result of a single assessment, be it from a large-scale assessment (district, state, or national test) or an end-of-unit classroom test, provides incomplete information. It would be inappropriate to use such a one-time snapshot of student performance as the sole basis for drawing conclusions about how well a student has achieved desired learning outcomes.

The classroom context offers a distinct advantage over large-scale assessments in that it allows teachers to take frequent samplings of student learning in different contexts. To continue the photographic analogy, classroom assessment enables us to construct a "photo album" containing a variety of pictures taken at different times with different lenses, backgrounds, and compositions. The photo album reveals a richer and more complete picture of each student than any single snapshot provides. Similarly, effective classroom assessment requires multiple sources of data, gathered over time, regarding student learning to enable us to make sound inferences about what our students know and can do.

The use of multiple sources of assessment data is important for summative assessments that form a basis for assigning report card grades. Rather than relying on a single end-of-unit test for assigning grades, effective teachers factor together a variety of sources of information, such as student products, performances, class participation, homework, and conferences. In addition, teachers can use multiple sources of data as the basis for formative

assessments. For example, prior to the start of a unit on the Civil War, the teacher might ask students to make a web showing what they already know about this period of history as a means of obtaining information about students' prior knowledge. The teacher might also interview several students at random to check their Civil War awareness. Formative assessment can also be used during instruction to check on student understandings and misconceptions. For instance, teachers often use brief written and oral quizzes and classroom discussions to determine if students have learned course material and can apply instructed skills. Such activities provide teachers with invaluable feedback on their teaching and allows them to adjust instruction to achieve more effective learning.

A second principle of sound classroom assessment practice relates to the relationship between instruction and assessment. It asserts that what teachers assess and how they assess should be congruent with their desired learning outcomes and the instructional methods they use to reach these outcomes. Learning outcomes specify what teachers want their students to know and to be able to do as a result of their educational experiences (Spady and Marshall, 1991). Learning outcomes may consist of knowledge (e.g., the Pythagorean theorem), skills (e.g., a problem-solving procedure), attitudes (e.g., appreciation of literature), or "habits of mind" (e.g., concern for accuracy). Instructional methods may include teacher presentations, cooperative learning, hands-on problem-solving activities, and independent study.

According to this "congruence principle," classroom assessments should be aligned with outcomes and instruction so as to provide valid measures of learning. For example, if teachers want students to demonstrate the capacity to write an effective persuasive essay, then their assessment would include samples of such writing evaluated against specified criteria. The use of a multiple-choice exam, in this case, would be an ill-suited measure of the intended outcome. Likewise, if teachers wish to develop students' ability to work collaboratively on a research project, then they would want to assess group processes and products as well as individual performance. Aligning assessment with curriculum

and instruction is crucial because what and how teachers assess sends a clear message to students about what knowledge, skills, processes, and attitudes are most important for them to learn and develop.

Selecting Classroom Assessment Methods

As with instruction, a variety of assessment approaches are available. The selection of methods for gathering information on students' learning should be determined, in part, by the congruence of these methods with desired outcomes and instructional approaches. In addition, teachers should consider at least three other factors when selecting assessment methods. First, assessment methods should be appropriate to the purpose(s) of, and the audience(s) for, a classroom assessment. For example, norm-referenced tests, such as the Iowa Tests of Basic Skills, are used primarily to satisfy demands for educational accountability. Their results are reported to the legislature, the Board of Education, school administrators, parents, and the general public. They are generally designed to determine how well students have learned particular concepts and skills as compared to other students in a norm group. However, at the classroom level, teachers are generally more interested in using assessments for diagnosing student needs, informing students and parents about progress, adjusting instruction, and motivating students. These varying purposes and audiences should determine the methods of assessment and the means by which the results are communicated.

A second consideration concerns the issue of reliability. Reliability refers to the dependability and consistency of assessment results. For instance, a writing assessment would be considered reliable when different raters assign similar scores to the same essays. Likewise, an observation checklist can be used reliably as long as teachers are careful to recognize that their ratings may differ from occasion to occasion (e.g., Monday morning versus Friday afternoon), and that their perceptions of individual students may be influenced by their attitudes toward each student.

Finally, practicality must be considered when selecting assessment methods for the classroom. For

example, while a science fair project/exhibition may provide a valid and reliable means of assessing student learning in a science class, the time required to prepare and present the project and the space needed for displaying the exhibit may be difficult to obtain in some schools.

THE FRAMEWORK OF ASSESSMENT APPROACHES

How then do we go about selecting appropriate assessment approaches to use in our classrooms? The Framework of Assessment Approaches⁴ (Figure 1) offers a systematic guide to help select and develop assessment methods for the classroom.

Assessment Approaches

Each of the five columns in the framework presents an assessment approach or format. Organizing the five approaches in this way highlights the most important similarities of the methods in the same column, and the most useful distinctions between the methods in different columns. However, the methods could be categorized differently. For example, "essays" could be listed under "constructed response formats," and "oral questioning" might be included under "performance assessments" or "constructed response formats."

The most widely used approaches to classroom assessment appear in the first and second columns. In **selected response formats**, students select the one correct or best answer from several alternatives, for example, multiple-choice items on the Comprehensive Tests of Basic Skills. In **constructed response formats** students generate a response (usually short) to an open-ended question, problem, or task, for example, when students are asked to label a diagram or chart, explain their reasoning, or show their work. However, growing recognition of the limitations of these approaches has led to calls for richer, more "authentic" assessment approaches (National Commission on Testing and Public Policy, 1990), like those listed under the third, fourth, and fifth columns. Teachers may use **product assessments** in which students create tangible products, such as a research paper, science fair project, or art portfolio. They may also use **perform-**

A FRAMEWORK OF ASSESSMENT APPROACHES				
SELECTED RESPONSE Formats	CONSTRUCTED RESPONSE Formats	PRODUCT Assessments	PERFORMANCE Assessments	PROCESS- FOCUSED Assessments
1. multiple choice 2. true/false 3. matching	4. fill in the blank 5. label a diagram 6. short answer 7. "show your work" 8. concept map 9. figural representation	WRITTEN 10. essay, story, or poem 11. research report 12. writing portfolio 13. diary or journal OTHER 14. science fair project 15. art exhibit or portfolio	16. musical, dance, or dramatic performance 17. science lab demonstration 18. typing test 19. athletic competition 20. debate 21. oral presentation	22. oral questioning 23. interview 24. think aloud 25. learning log 26. process folio 27. kid watching

Figure 1 A Framework of Assessment Approaches

mance assessments in which students engage in actual performances that require demonstrations of desired knowledge and skills, for example, oral presentations, demonstrations, or use of an online database to gather information. We draw a distinction between product and performance assessments to highlight the difference between evaluating a performance itself (e.g., students conducting a science lab demonstration) and evaluating the product of a performance (e.g., a science lab report). We further distinguish **process-focused assessments**, in which teachers elicit students' thinking processes (e.g., process observing, "think alouds"), because they are explicitly intended to provide insight into students' thinking processes rather than the products and performances that result from their thinking.

Assessment Methods

The methods listed in each column of Figure 1 are intended to characterize each assessment approach rather than exhaustively define it. Some of these methods are clearly associated with testing, such as

the multiple-choice items. Less formal methods, such as oral questioning and "kid watching," may not necessarily be associated with classroom assessment (Haertel, Ferrara, Korpi, & Prescott, 1984). However, use of these informal methods is essential to providing a complete picture of student learning.

It may be useful to provide examples of these methods. Methods one through five in the framework are generally familiar to teachers because they are among the most widely used classroom assessment methods. They are probably most often used to find out whether or not students can recall and understand factual information.⁵

In contrast, teachers use other assessment methods to get beyond the "correct" answer to more open-ended tasks in which an array of responses is acceptable and expected. Teachers often include short-answer questions in their tests (method six), for example, to pose questions that may not have a single correct or best answer. Math teachers may require students to "show their work" (method

seven) to determine what steps students follow in solving multi-step problems. Concept maps, semantic webs (Novak and Gowin, 1984), and other figural representations (methods eight and nine) allow teachers to gain insight into how students organize facts and concepts and to gauge the accuracy and complexity of their understandings.

Teachers assign essays and longer writing assignments such as research reports (methods ten and eleven) to provide feedback about students' abilities to locate and organize information and express ideas clearly in written form. In recent years, we have witnessed increased use of portfolios (method twelve) in language arts and other subject areas to collect representative student work and to chronicle development over time. Product exhibitions, such as science fair projects and art exhibits (methods fourteen and fifteen), allow students to demonstrate their ability to apply knowledge and skills in authentic contexts.

Performance assessments are especially well suited to certain content areas since they allow teachers and others to directly observe the application of desired skills. For example, teachers grade or critique students as they perform a musical piece, demonstrate a laboratory procedure, type for speed and accuracy, or participate in an athletic competition (methods sixteen through nineteen). Teachers may also organize debates and assign oral reports (methods twenty and twenty-one) in order to evaluate students' performances.

Determining what knowledge, thinking skills, and processes students apply in classroom learning situations requires classroom assessment methods that focus directly on thinking processes. Teachers may elicit students' thinking processes using oral questions like "How are these two things alike and different?" (method twenty-two); by interviewing students (method twenty-three) regarding the procedures they follow to generate products or what they think about while performing a task; or by asking students to "think out loud" (method twenty-four) as they solve a problem or make a decision. In addition, teachers may ask students to document their thinking processes by keeping a diary, learning log (method twenty-five), or process folio (method twenty-six). Finally, teachers can learn

about students' thinking processes by watching students individually and in groups as they function in the classroom—that is, by "kid watching" (method twenty-seven). This method is especially well suited to assessing the development of habits of mind, such as persistence and open-mindedness.

We provide these brief examples to highlight the variety of classroom assessment methods available to teachers. How then do we decide which approaches and methods to use? How can we make classroom assessments more thoughtful, sound, and effective? The following process offers a systematic guide to planning and evaluating classroom assessments.

A PROCESS FOR PLANNING AND CONDUCTING CLASSROOM ASSESSMENTS

Assessment is an essential component of the teaching-learning process. Without effective classroom assessment, it is impossible for us to know whether our students are learning what we want them to learn. We have described briefly a framework of assessment approaches and methods available to teachers. In the remainder of this chapter we present a process for planning, administering, and interpreting results from classroom assessments. An Assessment Planning Chart assists in this process. We then illustrate the process in use.

Six Steps for Planning, Administering, and Interpreting Classroom Assessments

1. Identify the learning outcomes to be assessed, the purposes for the assessment, and the audiences for the assessment results.
2. Select methods from the Framework of Assessment Approaches in Figure 1 to assess the outcomes that are appropriate to your assessment purposes and audiences.
3. Record your decisions from steps one and two in an Assessment Planning Chart (see Figure 3). Evaluate the appropriateness of the:

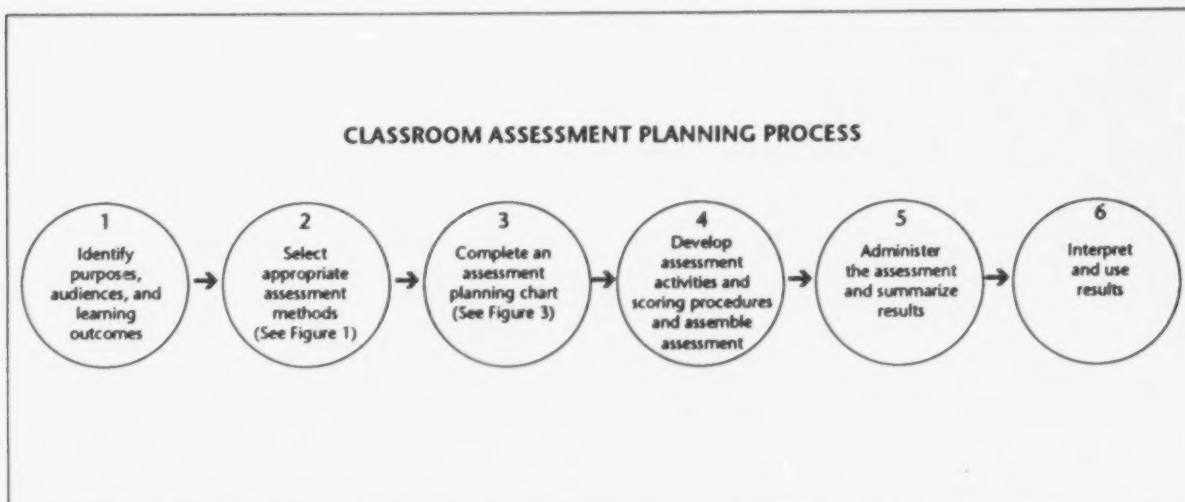


Figure 2 Six Steps for Planning, Administering, and Interpreting Classroom Assessments

- a. assessment approaches and methods you have chosen for your assessment outcomes, purposes, and audiences.
- b. time allotted to each outcome and assessment activity and the time required to administer, score, and interpret all assessments.
4. Develop and assemble assessment activities and scoring procedures.
5. Administer the assessment and score, rate, or otherwise summarize the results of the assessment for your audiences.
6. Interpret and use the results, keeping in mind the learning outcomes you assessed and your assessment purposes and audiences. Consider potential consequences of your planned uses of the assessment results.⁶

In the next section we present an Assessment Planning Chart, a helpful tool for use in the classroom assessment planning process.

Assessment Planning Chart

Architects create blueprints to communicate their overall vision for a building and to specify details for a builder. The builder then constructs the architect's vision by executing the details in the blueprint. The result is a safe and long-lasting (and,

hopefully, aesthetically pleasing) building. Similarly, classroom teachers can create assessment blueprints to communicate their overall vision for an assessment and to specify details such as outcomes to be assessed and assessment methods to be used. They then can use the blueprint to construct the envisioned assessment, developing activities that assess what has been specified. The result is twofold. First, the assessment that is developed from the blueprint produces valid information about what students know and can do. Second, the assessment clearly communicates to students what they should know and be able to do and what they actually know and can do.

An Assessment Planning Chart⁷ is a guide to completing the first two steps in the classroom assessment planning process: identifying learning outcomes to be assessed and selecting appropriate assessment methods from the Framework of Assessment Approaches. The Assessment Planning Chart also helps us reinforce the principles of multiple sources of data and the congruence of assessment and instruction discussed earlier. The generic Assessment Planning Chart (Figure 3) contains three elements necessary for planning thoughtful classroom assessments: content and process outcomes to be assessed, assessment methods to be used, and the amount of assessment time to be allotted to each outcome and method. Teachers can adapt the

ASSESSMENT PLANNING CHART					
Learning outcomes to be assessed: • Content • Process	A S S E S S M E N T M E T H O D S				Number of assess- ment activities and amount of assess- ment time required or allowed
Number of assessment activities and amount of assessment time required or allowed				TOTALS	

Figure 3 Assessment Planning Chart

generic Assessment Planning Chart to their specific needs and situations, as we illustrate at the end of this chapter.

Using the Assessment Planning Chart

In this section we describe steps to complete an assessment planning chart. First, list each outcome to be assessed, one per row, specifying the desired content, skill or process, and habit of mind. Second, after referring to the Framework of Assessment Approaches, write in one or more assessment methods to assess each outcome, one per column. Next, determine the number of assessment activities appropriate for each content, process, habit, and assessment method. This is a matter of deciding the portion of the total assessment activities and time that should be allocated to

each outcome using each assessment method. It is appropriate to write in numbers or percentages of assessment activities.

Space is provided at the end of each row and column to summarize the coverage of outcomes and use of each assessment method. Teachers can enter in each space the number of activities and amount of assessment time required or allowed to complete the assessment activities in each row and column. The same information can be entered in the space at the lower right-hand corner of the Assessment Planning Chart for a total assessment time. Teachers can refer to and modify each row total to clarify and control how much of any classroom assessment is devoted to each listed outcome, especially if each row total is expressed as a percent-

age of the total number of assessment activities or assessment time. Likewise, teachers can refer to and modify the column totals to clarify and control how much of the total assessment each method will comprise. Controlling the emphasis placed on each assessed outcome and the reliance on each assessment method is important for thoughtful and sound classroom assessments and for accurately communicating to students what is important for them to know and be able to do.

While teachers generally do not question the usefulness of blueprints like the generic Assessment Planning Chart, they often express concern that such tools are too cumbersome and time consuming to use. We disagree. Experience has shown that, with practice, use of the assessment planning process and tools like the Assessment Planning Chart becomes automatic and efficient. When teachers internalize the process, planning and developing a classroom assessment become a matter of following the six steps, adapting the assessment planning chart to their curriculum, and selecting and applying the appropriate assessment methods. In fact, many teachers already use parts of the process as they plan and conduct assessments in their classrooms. An advantage of the planning process we describe here is its systematic nature; it specifies and clarifies the steps necessary for conducting sound classroom assessments. Similarly, the Assessment Planning Chart explicitly links desired learning outcomes with appropriate assessment methods. Finally, the Framework of Assessment Approaches suggests a wider array of assessment methods than teachers may currently consider and use. The Assessment Planning Chart can be particularly effective when teachers work together to develop "banks" of activities to assess common instructional outcomes. Use of such a systematic planning process by grade-level or department teams results in more coordinated, valid, and reliable classroom assessments.

An Illustration of the Classroom Assessment Planning Process

To demonstrate the classroom assessment planning process, using the Framework of Assessment Approaches and Assessment Planning Chart, we

will refer to a hypothetical instructional unit for a middle school social studies class. Imagine a three-week-long instructional unit in which students explore the concepts of citizens' "rights and responsibilities" through an examination of various historical topics and contemporary issues. The intended outcomes for this unit might be as stated below.

Students will:

- develop an understanding of the concepts and principles involved in determining citizens' rights and responsibilities.
- increase their knowledge and appreciation of the rights and responsibilities assured to United States citizens under the Bill of Rights.
- analyze contemporary issues involving citizens' rights and responsibilities by applying concepts and principles developed during the unit.

These learning outcomes stress concept development and application, or transfer, to new situations. Thus, the assessment methods used during the unit will reflect these instructional goals. Since the teacher and the students are the primary audiences for the assessment information, the teacher will use both formative and summative assessments during the unit. Information gained from the formative assessment activities will help the teacher determine if students are developing appropriate understandings of the concepts and principles so that he or she can adjust instruction as necessary and inform students about their progress. Summative assessment activities will be used similarly and as the basis for evaluating student performance in order to assign grades. By identifying purposes, audiences, and learning outcomes, Step 1 in the assessment planning process is complete.

Step 2 is completed by reviewing the methods in the Framework of Assessment Approaches and by selecting several assessment methods appropriate for the identified purposes, audiences, and learning outcomes. The teacher may decide that the summative assessments will include:

- *Written Test.* An in-class test near the end of the unit. Students will write a brief analysis of the rights and responsibilities contained within a

specified constitutional amendment, on freedom of speech, for example.

- *Essay.* A persuasive essay that students will develop during the final days of the unit. They will state and defend their views on whether private citizens in the 1990s should be allowed to own firearms. Students will draft and refine these essays based on what they have learned in class, from outside reading and research, and from an in-class debate.
- *Debates.* Students will work on one of several teams to prepare for participation in one of several in-class debates. These debates will address several questions relevant to ownership of firearms: whether the need for U.S. citizens to own firearms for personal protection has increased or decreased since the late 18th century; whether citizens are likely to be more or less safe if the manufacture and sale of firearms were restricted; and whether an increase in safety assumed to result from such restrictions warrants denying citizens the right to bear arms guaranteed in the Bill of Rights.

In order to adjust instructional activities as necessary and to inform students throughout the unit regarding their progress on the learning outcomes for the unit, the teacher has planned several formative assessment activities. Some of these activities will assess students' understandings of the concepts of rights and responsibilities:

- *Written List.* Early in the unit, the teacher will have students work in small groups to discuss the rights guaranteed them as citizens of the United States. Following the discussion, students will individually prepare a written list of their constitutional rights as they understand them. Student responses to this open-ended assessment activity will give the teacher insight into students' understanding of important unit concepts.
- *Oral Questions.* Throughout the unit, the teacher will lead discussions and pose oral questions to the class to determine their understandings of, and ability to apply, the concepts and principles of citizens' rights and responsibilities.

Other formative assessment activities will focus on students' thinking strategies as they prepare for the debates:

- *Kid Watching.* As students work in teams to prepare for the debates, the teacher will listen and observe to determine if they are addressing relevant issues, employing relevant information, developing clear arguments, supporting their arguments, anticipating rebuttals, developing responses, and acknowledging different points of view.
- *Think-Aloud Activities.* Throughout the unit, the teacher will ask students to describe their reasoning processes by thinking out loud. By listening to students as they articulate their thoughts, the teacher can identify misconceptions and fallacious reasoning so as to provide needed clarification or assistance.

Completing Step 3 of the classroom assessment planning process will involve developing an Assessment Planning Chart that summarizes all of the assessment activities planned for the unit. An example is provided in Figure 4.

In this example, we have listed the three intended unit outcomes and the seven assessment activities planned for this unit. We have also indicated numbers of assessment activities and estimated the amount of time required for each activity. With this chart, the teacher has a clear picture of the activities and amounts of time devoted to assessing each outcome and the portion of all assessment activities each method comprises. The completed chart enables the teacher to evaluate the appropriateness and degree of balance between the learning outcomes and methods of assessment. As a result of this step, the teacher may decide to change the emphasis on one or another of the outcomes or to devote more or less time to one or more of the assessment activities. In addition to using the Assessment Planning Chart for planning assessments in an entire unit, the chart can be used to develop a single assessment, such as an end-of-unit test.

Completing Steps 4 through 6 in the process involves developing, administering, scoring, and interpreting the results from the in-class short-answer

ASSESSMENT PLANNING CHART for Unit on "rights and responsibilities"								
OUTCOMES	ASSESSMENT METHODS							Summary of Assessment Activities
	FORMATIVE ASSESSMENTS				SUMMATIVE ASSESSMENTS			
	List	Oral Questions	Kid Watching	"Think- Aloud"	Paper-and- Pencil Test	Essay	Debate	
1 Knowledge	open-ended list of rights: 5-10 min. in groups, 5 min. individual work	5-10 questions estimated: 1 minute each	4-5 student groups 30 minutes	5-10 students 5 minutes each	1 analysis 15-25 minutes	1 hour		- all seven methods used
2 Understanding						3 debates 30 minutes each		- oral quest. - kid watching - think-aloud - test - essay - debate
3 Application								- think-aloud - essay - debate
Estimated time for assessment activities	10-15 minutes	5-10 minutes	30 minutes	25-30 minutes	15-25 minutes	1 hour	1 1/2 hours	3 hrs. 55 min. to 4hrs. 40 min.

Figure 4 Sample Assessment Planning Chart

test, oral discussion questions, and all other planned assessment activities. Step 4 is probably the most labor-intensive part of the classroom assessment planning process. In this step the teacher will develop, or select from an existing bank, assessment activities and accompanying scoring procedures and assemble the activities into a form for use with students. For example, the teacher might jot down notes for the listing activity, topics for oral questions, focuses for kid watching and think-aloud activities. But the teacher may want to provide the in-class test, persuasive essay prompt, and debate team assignments and topics to the students more formally and in writing.

Step 5 involves administering each assessment activity, scoring or otherwise evaluating student responses, and summarizing the qualities and charac-

teristics of student responses. Using the "rights and responsibilities" unit to illustrate, the teacher may decide to evaluate students' responses in each summative assessment by giving one to two points for each written summary in the in-class test and writing comments in the margins regarding the comprehensiveness and accuracy of each summary; by rating the persuasive essay using a four- or six-point holistic scoring system that focuses on characteristics of persuasive writing and circling any grammatical errors; and by evaluating students' performances in the debates on several dimensions, such as their observance of rules of debating (which the teacher provided as part of the unit), oral discourse style, persuasiveness of arguments, and effectiveness in rebuttals. The teacher may de-

cide to evaluate students' responses to the formative assessment less formally. For example, the teacher may provide one- or two-word comments on student lists of Constitutional rights, only oral comments on students' responses during oral questioning, and a short written note or brief conversation with students after the kid-watching and think-aloud activities. Decisions such as these are determined by the purposes and audiences for each assessment activity.

In the final step of this process, Step 6, the teacher will communicate interpretations, conclusions, decisions, and other actions to take based on the assessment results. As in Steps 1 through 5, the teacher will communicate in ways that are appropriate for students, parents, administrators, teachers, and other audiences. For instance, the teacher may have adjusted instructional activities based on what he or she learned from the four formative assessment activities and told the students about these adjustments. In contrast, the teacher may inform students of their scores on the three summative assessments, perhaps indicating letter grades corresponding to each score, and incorporate these scores into the semester course grade. In order to communicate to students what is expected of them during the unit, the teacher would have informed students ahead of time how each assessment activity was to be evaluated and used. The information from all seven assessment activities could also be used for parent conferences and mid-semester progress reports of student performance and progress.

CLOSING

Effective assessment is part of effective teaching and learning (Schafer, 1991). In this chapter we have discussed principles of sound assessment, described a process for systematically planning classroom assessments, provided a framework for selecting assessment approaches and methods, and illustrated the use of the planning process. While

we could have presented additional principles and practices of classroom assessment, we believe that teachers can go a long way toward developing more thoughtful classroom assessments by applying the ideas and tools in this chapter.

Authors' note: Our thanks to the Maryland Working Group on Assessing Thinking for their work on the Framework of Assessment Approaches, to Susan Ciotta and Sandi Benson for their fine work on the graphic displays, and to Barbara Reeves for her insightful comments on a draft of this chapter.

NOTES

1. Defined as tasks that are valued in their own right (Linn, Baker, & Dunbar, 1991) because they require students to directly apply valued skills, processes, and knowledge.
2. Thoughtful classroom assessments result from deliberate and systematic planning whereby teachers select methods of assessment that are congruent with their desired learning outcomes and their methods of instruction.
3. Classroom assessments can include paper-pencil tests, oral and written quizzes, homework assignments, class discussions, and other classroom activities in which teachers gather information about student learning. While the terms *assessment*, *test*, *evaluation*, and *measurement* are often used interchangeably, we use the term *assessment*, as defined in this footnote, throughout this chapter.
4. The Framework of Assessment Approaches is based on the work of the Maryland Working Group on Assessing Thinking, whose members during 1987-1990 included state and local school system staff and university faculty in instruction and assessment.
5. However, we stress that these methods are not limited to only this purpose. Many writers and speakers have amply demonstrated the use of multiple-choice items to assess, for example, students' reasoning processes in science and mathematics as well as to determine if students can select a correct answer from among alternatives.
6. There can be negative or positive consequences to our use of assessment results. For example, placing too much faith in a multiple-choice test of science knowledge could mislead a teacher into believing that a student is adequately prepared to perform a laboratory experiment involving chemicals.
7. We have borrowed the term, Assessment Planning Chart, from Stiggins, Rubel, and Quellmalz (1988).

REFERENCES

- Brown, F. G. (1983). *Principles of educational and psychological testing* (3rd ed.). New York: Holt, Rhinehart and Winston.
- Ferrara, S., & McTighe, J. (in press). *The mindful school: How to assess in the thoughtful classroom*. Palatine, IL: Skylight Publishing.
- Haertel, E., Ferrara, S., Korpi, M., & Prescott, B. (1984). *Testing in secondary schools: Student perspectives*. Paper presented at the annual meeting of the American Educational Research Association, New Orleans.
- Linn, R. L., Baker, E. L., & Dunbar, S. B. (1991). Complex, performance-based assessment: Expectations and validation criteria. *Educational Researcher*, 20(8), 15-21.
- McTighe, J., & Schollenberger, J. (1991). Why teach thinking: A statement of rationale. In A. Costa (Ed.), *Developing minds: A resource book for teaching thinking* (rev. ed.) (pp. 2-5). Alexandria, VA: Association for Supervision and Curriculum Development.
- National Commission on Testing and Public Policy. (1990). *From gatekeeper to gateway: Testing in America*. Chestnut Hill, MA: Boston College.
- Novak, J. D., & Gowin, B. D. (1984). *Learning how to learn*. New York: Cambridge University Press.
- Schafer, W. D. (1991). Essential assessment skills in professional education of teachers. *Educational Measurement: Issues and Practice*, 10(1), 3-6, 12.
- Secretary's Commission on Achieving Necessary Skills. (1991). *What work requires of schools: A SCANS report for America 2000*. Washington, DC: U.S. Department of Labor.
- Spady, W. G., & Marshall, K. J. (1991). Beyond traditional outcome-based education. *Educational Leadership*, 49(2), 67-75.
- Stiggins, R. J. (1991). Relevant classroom assessment training for teachers. *Educational Measurement: Issues and Practice*, 10(1), 7-12.
- Stiggins, R. J., Rubel, E., & Quellmalz, E. (1988). *Measuring thinking skills in the classroom* (rev. ed.). Washington, DC: National Education Association.

THE MOST SIGNIFICANT OUTCOME

Robin Fogarty

Our mission as educators is to help every child become a more active, engaged, committed, and skillful learner, not just for a test, but for a lifetime.—James Bellanca

WHY TEACH FOR TRANSFER?
Transfer of learning simply means the use in a new context of something learned in an earlier context.

All teaching is for transfer. All learning is for transfer. It's that simple. Yet considerable research shows that a startling amount of the knowledge that people acquire in subject matter instruction is "inert." This means that the knowledge is there in memory for the multiple-choice quiz, but the knowledge is passive. It is not retrieved in the context of active problem solving or creativity, such as writing an essay. Inert knowledge does not contribute much to the cognitive ability of the learner except for performance on school quizzes. One of the goals of teaching for transfer is teaching for active rather than inert knowledge.

The mission of the thinking classroom is to extend learning, to bridge the old to the new, and to lead students toward relevant transfer and use of knowledge

across academic content and into life situations. Once we accept this mission, we explicitly target skills, concepts, and attitudes for transfer. Once targeted, we mediate or shepherd the transfer of learning within the content we teach, across to other disciplines, and into life situations.

WHAT ARE THE LEVELS OF TRANSFER?

Once transfer of learning becomes the targeted outcome, the search for ways to assess that outcome of course follows. Transfer of learning can be assessed by comparison with a continuum of transfer behavior. This continuum has been developed as a tracking or assessment tool. With it the teacher can begin to track students' transfer, and learners can begin to reflect—using skills of metacognition—on their own levels of transfer.

The continuum in Figure 1 represents levels of transfer that range from simple or near transfer to more complex or far-reaching transfer. Six distinctions are made depicting learner dispositions that overlook, duplicate, replicate, integrate, map, and innovate with transfer. The model is framed, however, by the philosophical stance that these various levels of transfer offer evidence that is extremely situ-

SITUATIONAL DISPOSITIONS TOWARD TRANSFER		
	Does the learner:	
SIMPLE	OVERLOOK:	Miss appropriate opportunities; overlook; persist in former ways?
	DUPLICATE:	Perform the drill exactly as practiced; duplicate with no change; copy?
	REPLICATE:	Tailor, but apply knowledge only in similar situations; produce work that all looks alike?
COMPLEX	INTEGRATE:	Become more aware; integrate; subtly combine knowledge with other ideas and situations; use information with raised consciousness?
	MAP:	Carry a strategy to another content and into life situations; associate?
	INNOVATE:	Invent; take ideas beyond the initial conception; take risks; diverge?

Figure 1 Situational Dispositions Toward Transfer

ational. That is to say, transfer of learning—using what is learned in one context in an entirely new context—seems to depend on a number of significant variables.

For example, learner dispositions to internalize and apply ideas, concepts, skills, and attitudes may depend on past knowledge and prior experience (How much background does the learner have?); the physical learning environment (Is the climate conducive to learning?); the match between teaching and learning styles (Is the learner enabled by the ways the material is being presented?); the feelings, mood, and emotional state of the learner and teacher (Does the learner [or teacher] have affective variables that are enhancing or blocking learning?) and innumerable other external and internal influences. Thus, the continuum is presented simply as a loose framework of situational dispositions toward transfer. In no way is the model intended for judgmental, summative evaluation. The examples are offered as guides to provide insight into student transfer both for the teacher or observer and the student or learner.

In Figure 2, each of the six situational dispositions for transfer are represented both figuratively and graphically. Each disposition toward transfer is

defined and elaborated with classroom examples of what one might see and hear from students at each level. To know what it looks like and what it sounds like provides the concrete clues to the level of transfer occurring.

We see in student work, in essence, collected artifacts that provide graphic evidence of transfer. Similarly, what we hear students say gives verbal clues to the personal connection making that goes on in their thought processes. Both the graphic representation of students' thinking and the oral articulation of how they are internalizing ideas are helpful (See Figures 2 and 3). One provides evidence of the external product of transfer, while the other provides evidence of the internal process of making the transfer. Both are powerful cues that suggest where students are in the transfer process; what they have learned and how they're using it.

Overlooking Transfer

Ollie the Head-in-the-sand Ostrich overlooks transfer. This learner misses appropriate opportunities, persists in former ways, and may be intentionally or unintentionally overlooking the opportunities for transfer. Sometimes learners choose not to use something new. Whatever the stated reasons—"The com-

LOOKING AND LISTENING FOR TRANSFER

Model	Illustration	Transfer Disposition	Looks Like	Sounds Like
BIRDS Ollie the Head-in-the-sand Ostrich		Overlooks	Persists in writing in manuscript form rather than cursive. (New skill overlooked or avoided.)	"I get it right on the dittos, but I forget to use punctuation when I write an essay." (Not applying mechanical learning.)
Dan the Drilling Woodpecker		Duplicates	Plagiarism is the most obvious student artifact of duplication. (Unable to synthesize in own words.)	"Mine is not to question why—just invert and multiply." [When dividing fractions.] (No understanding of what she or he is doing.)
Laura the Look-alike Penguin		Replicates	"Bed to Bed" or narrative style. "He got up. He did this. He went to bed." or "He was born. He did this. He died." (Student portfolio of work never varies.)	"Paragraphing means I must have three 'indents' per page." (Tailors into own story or essay, but paragraphs inappropriately.)
Jonathan Livingston Seagull		Integrates	Student writing essay incorporates newly learned French words. (Applying: weaving old and new.)	"I always try to guess (predict) what's gonna happen next on T.V. shows." (Connects to prior knowledge and experience; relates what's learned to personal experience.)
Cathy the Carrier Pigeon		Maps	Graphs information for a social studies report with the help of the math teacher to actually design the graphs. (Connecting to another.)	From a parent: "Tina suggested we brainstorm our vacation ideas and rank them to help us decide." (Carries new skills into life situations.)
Samantha the Soaring Eagle		Innovates	After studying flow charts for computer class, student constructs a Rube Goldberg-type invention. (Innovates; diverges; goes beyond and creates novel.)	"I took the idea of the Mr. Potato Head and created a mix-and-match grid of ideas for our Earth Day project." (Generalizes ideas from experience and transfers creatively.)

Figure 2 Looking and Listening For Transfer

ASSESSING TRANSFER	
WHAT WE SEE (External Product)	WHAT WE HEAR (Internal Process)
• student work • collected artifacts • concrete evidence • graphic representation	• student conversations • verbal clues • personal connection making • oral articulation

Figure 3 Assessing Transfer

puter takes too long"—these learners sometimes unintentionally overlook an opportunity to apply something in a new context, because they just don't "get it"; they miss the connection. If asked, "Why don't you just multiply the number of words in a line by the number of lines—instead of counting every word?" one of these learners might reply, "Oh? I never thought of that."

Transfer that Duplicates

Dan the Drilling Woodpecker duplicates in transfer. This learner performs the drill or reproduces the product exactly as practiced. There is no deviation or personalization. The transfer appears quite rehearsed, mechanical, directed, and procedural. ("Divide, multiply, subtract. Bring down. Divide, multiply, subtract. Bring down.")

Plagiarism is the ultimate example of duplication. "Where can I get a copy of that?"; "I used the definition verbatim"; or "I need a pattern in order to make this," are all verbal clues to duplicated transfer.

Transfer that Replicates

Laura, the Look-alike Penguin replicates. This learner duplicates, but tailors the learning for personal relevance. Using a given model the learner structures the variables to meet personal needs. ("I used the idea of note cards, but I didn't actually use

cards. I just divided the paper into sections so I could do it on my computer.") However, every application (although modified for relevant use) is used in a similar contextual framework. The learner who replicates exemplifies simple transfer and does not break out of the model she or he establishes.

Transfer that Integrates

Jonathan Livingston Seagull integrates with a raised consciousness. This learner, acutely aware of an idea, combines the new learning with prior knowledge and past experiences. The transfer is subtle and may not always be easy to track because the learning is assimilated so smoothly into the learner's existing framework. In fact, sometimes the learner actually says, "I already knew how to outline," or "I've always done my essays from an outline." It's not new—but the prior learning is refined and enhanced. In this integrated level of complex transfer, the learner folds the new learning in with the old, blending the two together.

Transfer that Maps

Cathy the Carrier Pigeon deliberately moves the learning in one context to a different context. The learner makes explicit bridges by strategically planning future applications. The transfer seems crystal clear and application is made with ease. The learner at this level of transfer might comment,

"I'm going to use the science report on pollution in my communications class. We have to develop a public service commercial message."

What distinguishes this transfer from the previous model of integrated use is the explicitness with which the learner applies the ideas. There is obvious intent to move ideas from one context to another in this learner transfer model and the risk taking required is greater than in the previous levels.

Transfer that Innovates

Samantha (or Sam) the Soaring Eagle innovates. This learner creatively transforms learning by grasping the seeds of an idea and researching, reshaping, reforming, and renaming to such an extent that the original learning may be almost indistinguishable or at least vastly modified in unique ways. This learner might say, "Rather than write about my summer vacation from my point of view, I wrote about it from the point of view of my dog, Rags. I bet you wondered why I called it 'Dog Days of Summer.'" This level of transfer is noted for its novel ideas and the risk taking that accompanies

such creative thinking. Sams are wonderful connection makers—anything goes!

CONCLUSION

The six dispositions of transfer do not necessarily occur in sequence, but there seems to be an inherent hierarchy. The first three are considered simple transfer with minimal risk taking involved, while the last three models seem more complex and require considerable mindfulness and risk taking.

However, teacher and learner knowledge about and awareness of the levels of transfer by themselves increase the likelihood of moving learning along. In other words, once you know about the levels and cues to transfer, you can't *not* know! The awareness is there. The level of transfer starts to be consciously monitored with even this relatively minor attention to it. Interestingly, this self awareness also seems to be accompanied by a sense of responsibility. Once aware of transfer, learners seem to feel accountable to attempt transfer and to use new ideas. In addition, once teachers and learners put their radar out for evidence of transfer, transfer gets more attention.

REFERENCES

- Bellanca, J., & Fogarty, R. (1990). *Blueprints for thinking in the cooperative classroom*. Palatine, IL: Skylight Publishing, Inc.
- Beyer, B. (1987). *Practical strategies for the teaching of thinking*. Boston: Allyn and Bacon.
- Brandt, R. (1988). On teaching thinking: A conversation with Arthur Costa. *Educational Leadership*, 45(7), 11.
- Costa, A. (1991). The search for intelligent life. In *The school as a home for the mind*. Palatine, IL: Skylight Publishing, Inc.
- Cousins, N. (1981). *Human options*. New York: Norton.
- Fogarty, R. (1989). *From training to transfer: The role of creativity in the adult learner*. Doctoral dissertation, Loyola University of Chicago.
- Fogarty, R., & Bellanca, J. (1989). *Patterns for thinking: Patterns for transfer*. Palatine, IL: Skylight Publishing, Inc.
- Fogarty, R., Perkins, D., & Barell, J. (1991). *The mindful school: How to teach for transfer*. Palatine, IL: Skylight Publishing, Inc.
- Hunter, M. (1982). *Teach for transfer*. El Segundo, CA: TIP Publications.
- Joyce, B. (1986). *Improving America's schools*. New York: Longman.
- Perkins, D. (1988, August 6). Thinking frames. Paper delivered at ASCD Conference on Approaches to Teaching Thinking, Alexandria, VA, p. 14-15.
- Perkins, D. (1986). *Knowledge as design*. Hillsdale, NJ: Erlbaum.
- Perkins, D., Barell, J., & Fogarty, R. (1989). *Teaching for transfer* (Course Notebook). Palatine, IL: Skylight Publishing, Inc.

ASSESSING SIGNIFICANT OUTCOMES

- Perkins, D., & Salomon, G. (1989, January-February). Are cognitive skills context bound? *Educational Researcher*, pp. 16-25.
- Posner, M., & Keele, S. (1973). Skill learning. In R. Travers, (Ed.), *Second handbook of research on teaching*. Chicago: Rand McNally, pp. 805-831.
- Tyler, R. (1986/87). The first most significant curriculum events in the twentieth century. *Educational Leadership*, 44(4), 36-37.
- Wittrock, M. (1967). Replacement and nonreplacement strategies in children's problem solving. *Journal of Educational Psychology*, 58(2), 69-74.

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one-story intellects,
two-story intellects, and three-story
intellects with skylights. All fact collectors who have
no aim beyond their facts are one-story men. Two-story men compare,
reason, generalize, using the labor of fact collectors as their own.
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Designs for Change focuses on the classroom. Active mental engagement is the factor that ultimately reveals the nature of student learning. Three strategic categories of student learning are addressed: how students learn to think; how students cooperate and become actively involved in the learning process; and how educators assess the growth of students in authentic and beneficial ways.

ISBN 0-932935-40-0

ISBN 0-932935-40-0



9 780932 935403

SKYLIGHT
PUBLISHING

200 E. Wood Street, Suite 211
Peabody, IL 60067

676